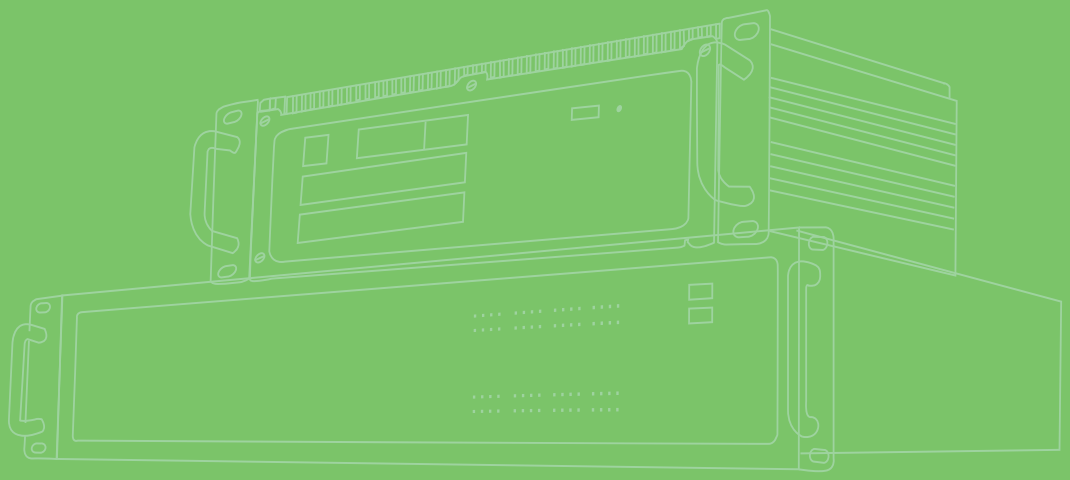

User Manual

ECU-4674 Series

Intel® Atom™ N2600 Power & Energy Computers with 8 x LAN, 10/18 x COM, 8 x DI, 8 x DO, 1 x IRIG-B and 1 x PCI-104

ADVANTECH

Enabling an Intelligent Planet

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For technical support and service, please visit our support website at:

http://www.advantech.com/support/

This manual is for ECU-4674 Series

Part No. XXXXXXXXXX Edition 1

Printed in China September 2014

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

FCC Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user is required to correct interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -25° C (-13° F) OR ABOVE 70° C (158° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
17. Due to the sensitive nature of the equipment it must be stored in a restricted access location, only accessible by qualified engineers.
18. When installing this equipment, ensure that the Earth cable is securely attached using a 3.5 mm screw.
19. The equipment does not include a power cord and plug.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

Overview

This chapter provides an overview of the ECU-4674 Series' specifications.

Sections include:

- Introduction
- Hardware Specifications
- Safety Precautions
- Block Diagram
- Chassis Dimensions
- Packing List

1.1 Introduction

For Power and Energy Automation, Advantech has developed ECU-4000 series products for Embedded Automation Computers to meet the most demanding computing requirement in Smart Substation's Bay level application, which are certified by IEC 61850-3 and IEEE 1613 to meet the harsh and critical requirements of smart grid automation; It is easy to use for Smart substation communication Platform & Gateway & Protocol Conversion; Provide high Performance and reliable functionality to meet the most critical computing applications; Support Remote monitoring and diagnosis for the remote device connectivity to enhance maintenance efficiency.

the ECU-4674 is targeted at Data Server and Communication Gateway in Substations Bay level, for Data Gateway for IEC 61850, Within a substation, there are lots of devices using a wide variety of protocols. Status and information of devices need to be monitored and controlled reliably; hence, a reliable automation controller plays such an important data protocol gateway, communication server and intelligent Device (IED) analyzer at a substation.

ECU-4674 is Intel Atom N2600 1.6Ghz Power & Energy Automation Computer with 8xLAN,18xCOM,8DI, 8DO,1x IRIG-B and PCI-104 Expansion, ECU-4674 series products is compliant with Electricity Certificate IV level (especially for China) and IEC 61850-3 and IEEE 1613 certification , which provide higher reliability and stability, suitable for any Global Power & Energy automation market and harsh environment. with versatile communication interface to use for Smart substation Communication server and IED Analyzer to fulfill the Data Gateway & Protocol Conversion requirement easily. Featuring a fanless design with high performance Intel Atom N2600 processor.

Certification for Reliable: Reliable IEC 61850-3 platform

- IEC 61850-3 and IEEE 1613 certification, ECU-4674 has higher standard than other embedded automation controller and contributes to higher reliability and stability, suitable for any Global P&E automation market and harsh environment.
- China Electricity Certificate IV Test level to provide the high reliability and competence in China Power & Energy automation market.

Isolation & High Speed Communication Interface

- Comprehensive communication interface to use for Smart substation Communication server and IED Analyzer to implement Data Gateway & Protocol Conversion easily ,support for variety of protocol (IEC-60870-101/103/104,DNP3.0 etc).
- Network interface are required to respond to real-time data and collect high-density network packets, handle accurately to facilitate data analysis.
- Flexible With versatile communication interface: IRIG-B Time Sync. LAN, to use for Smart substation Communication server and IED Analyzer to fulfill the Data Gateway & Protocol Conversion requirement easily.

Easy to Diagnose System & Communication and Enhance Efficiency Maintenance

- iCDManager Design to provide the remote monitoring(instant alert & event Log) and diagnosis for the remote device connectivity to enhance Network communication maintenance efficiency.
- Remote Diagnose and manage System to provide the high system maintenance efficiency.
- The rear IO connection and LEDs on front panel for all ports and modes, simplify the monitoring status for operation.

Fast and Easy for ODM Customization

- Structured and functional module Internal design for easy customization and Fast assembly to fulfill the different kind of application by T-Parts manufacture process
- Customer Focused Service provide Fast response for customization development request based on this product's main hardware structure

1.2 Hardware Specifications

General:

- **Certification:** CE, FCC class A, UL, CCC, Electricity IV level for China (Compatible IEC 61850-3, IEEE 1613)
- **Dimensions (W x D x H):** 2U (440 x 220 x 88 mm/17.3" x 8.6" x 3.4") fits into standard 19 inch rack
- **Enclosure:** SECC & Aluminum
- **Mounting:** 2U Rackmount
- **Power Consumption:** 30 W/220 V_{AC} or V_{DC} (Typical)
- **Power Requirements:** Supports single power input
  Power 1: 100 ~ 240 VAC or 100 ~ 240 VDC (Power 2: Optional dual power input extend)
- **Weight:** 5 kg
- **System Design:** Fanless design
- **OS Support:** Windows 7,WES 7 and Linux
- **iCDManager:** intelligent Connectivity Diagnose and Manager Software

System Hardware

- **CPU:** Intel Atom N2600 1.6 GHz
- **Memory:** 2G DDR3 SDRAM built-in
- **Indicators:** LEDs for Power, HDD, Programmable LED, IRIG-B, LAN (Active, LINK) and Serial (Tx, Rx)
- **Storage:** CF 1 x internal type I/II CompactFlash® slot
  HDD Built-in two 2.5" SATA HDD bracket
- **Display:** Intel NM10, DX9, MPEG2 Decode controller
  DB15 VGA connector, up to 1920 x 1080
- **PCI-104 Slot:** 1 x PCI-104 supports +3.3 V & +5 V & +12 V
- **Reset Button:** Yes
- **WatchDog Timer:** Programmable 256 levels time interval, from 1 to 255 seconds for each tier

I/O Interface

- **Serial Ports:**
  - 2 x DB-9 RS-232(5-Pin)
  - 8 x screw terminals with 3-wired RS-232/485 (For ECU-4674-LA53SAE)
  - 16 x screw terminals with 3-wired RS-232/485 (For ECU-4674-A53SAE)
  - (Automatic RS-485 data flow control) 2,500 VDC isolation
- **Serial Port Speed:**
  - (COM1, COM2) RS-232: 50 ~ 115200bps,
  - (COM3 ~ COM18) RS-232: 50 ~ 115200bps, RS-485: 50 ~ 921600bps
- **LAN:**
  - 2 x 10/100/1000 Base-T RJ-45 ports (Intel 82574L Gigabit Ethernet Controller, teaming function supported, IEEE-1588 hardware capability)
  - 6 x 10/100 Base-T RJ-45 ports (6 Realtek RTL8100CL Network controllers)
- **USB Ports:** 5 x USB, UHCI, Rev. 2.0 compliant 1 x Front, 3 x Rear and 1 x Internal ports
- **Digital Input:** 8-ch isolated digital input
  (For ECU-4674-A53SAE)
  - Wet contact: Logic 0:0~3 VDC; Logic 1: 10 ~ 30 VDC
  - Isolation protect: 2000 VDC, 30-50 VDC over voltage protection
  - Opto-Isolator Response:25us-interrupt capable
- **Digital Output:** 8-ch isolated digital output
  (For ECU-4674-A53SAE)
  - 2000 VDC isolation, 200mA max/channel sink current (at room temperature)
  - Open collector to 40V (200mA maximum sink current load) 3 kHz speed
- **Programmable LED:** 8-ch programmable LED indicator
- **Extension:** 1 x PCI-104

Time Synchronization Interface (For ECU-4674-A53SAE):

- **Type:** IRIG-B
- **Channel:** 1
- **Support Format:** IRIG-B00X according to IRIG STANDARD 04, 200-98
- **Message Syntax:** QQQHHMMSS (year, day, hour, minute & second)
- **Resolution of Time:** 1 s

Environment

- **Humidity:** 95% @ 40°C (non-condensing)
- **Operating Temperature:**
  - IEC 60068-2-1/2 with 100% CPU/ I/O loading,
    24 hrs -25 ~ 70° C (-13 ~ 158° F) (For ECU-4674-LA53SAE)
  - IEC 60068-2-1/2 with 100% CPU/ I/O loading,
    24 hrs -25 ~ 60° C (-13 ~ 140° F) (For ECU-4674-A53SAE)
- **Operating Humidity:** -20 ~ 95% (non-condensing)
- **Shock Protection:** IEC 68 2-27 CompactFlash: 50 G half sine, 11 ms HDD: 20 G half sine, 11 ms
- **Vibration Protection: I**EC 68 2-64 (Random 1 Oct./min, 1hr/axis.) CompactFlash: 2 Grms @ 5 ~ 500 Hz, HDD: 1Grms @ 5 ~ 500 Hz

1.3 Block Diagram

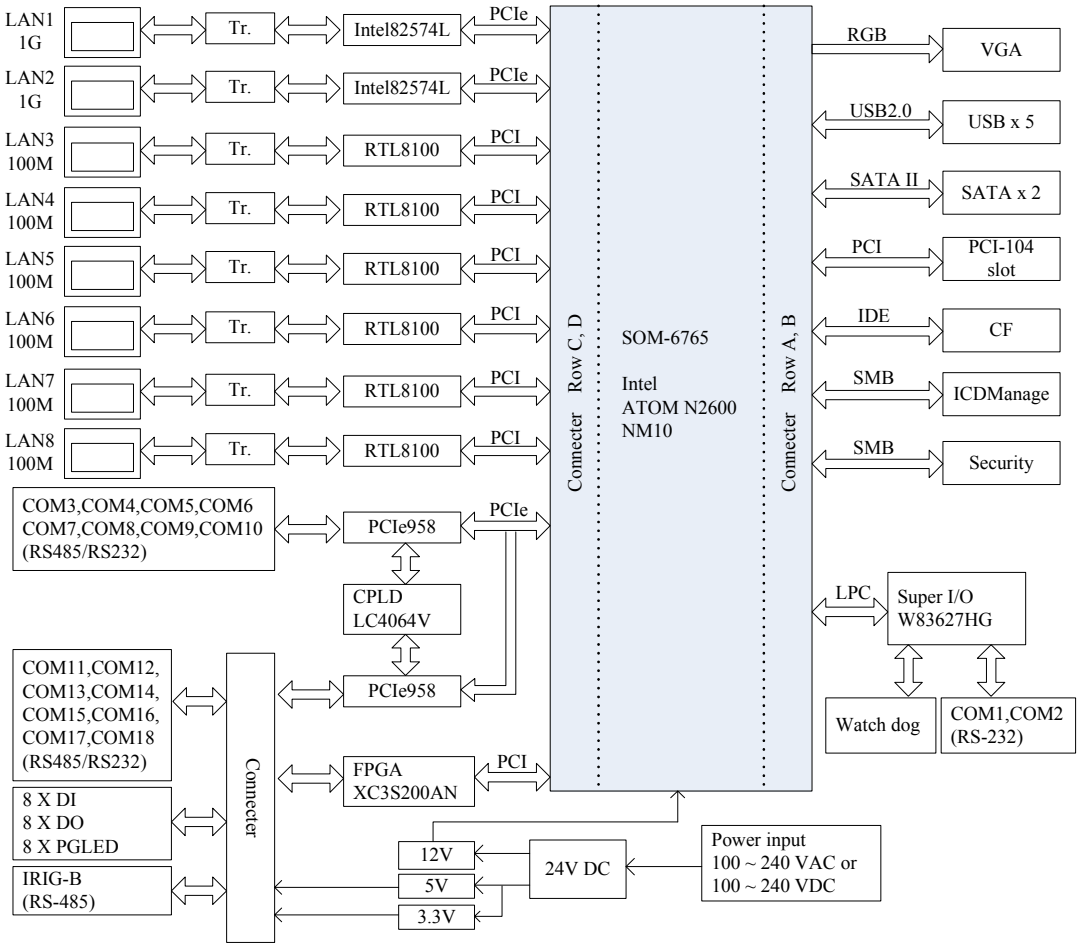


Figure 1.1 ECU-4674 Series Product Function Block

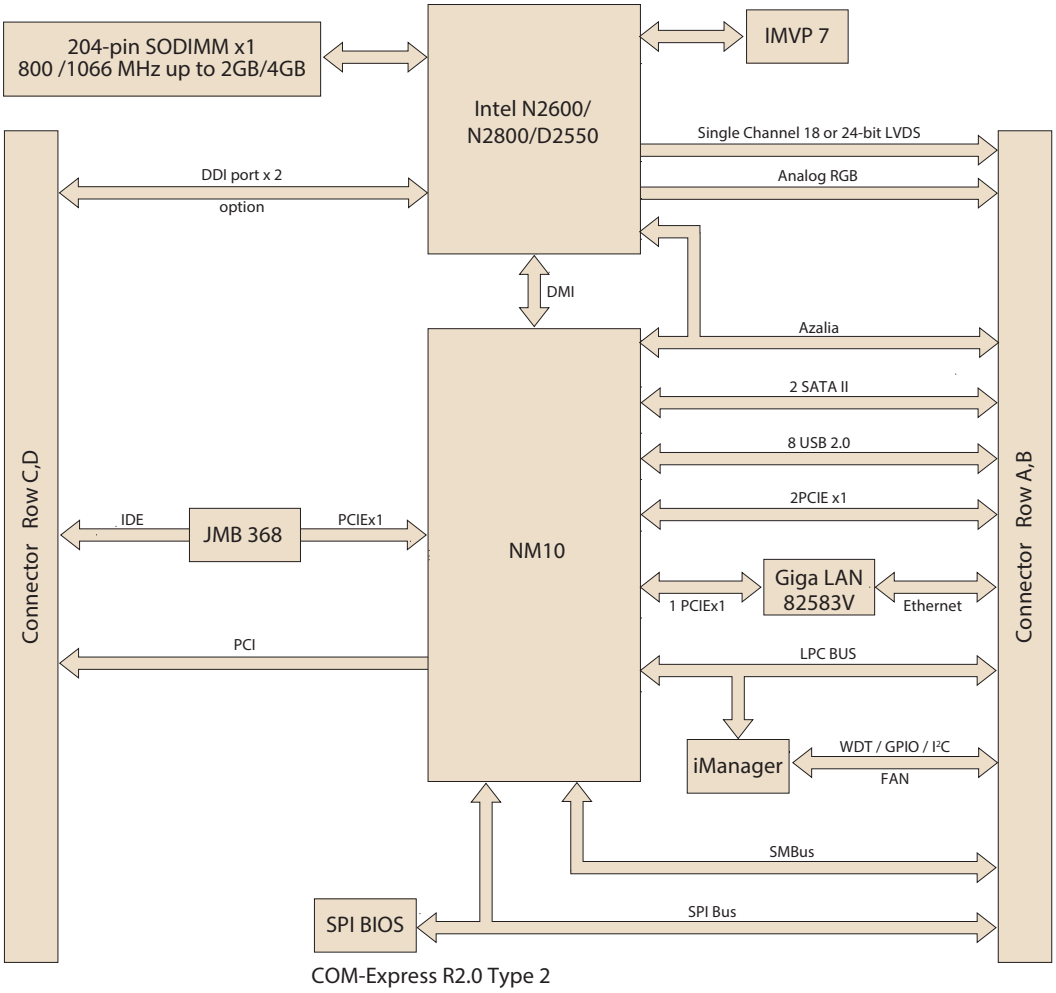


Figure 1.2 SOM-6765 Block Diagram

1.4 Safety Precautions

The following messages informs how to make each connection. In most cases, you will simply need to connect a standard cable.

Warning! *Always disconnect the power cord from your chassis whenever you are working on it. Do not connect while the power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.*

Caution! *Always ground yourself to remove any static electric charge before touching ECU-4674 Series Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.*

Note! *If DC voltage is supplied by an external circuit, please put a protection device in the power supply input port.*

1.5 Chassis Dimensions

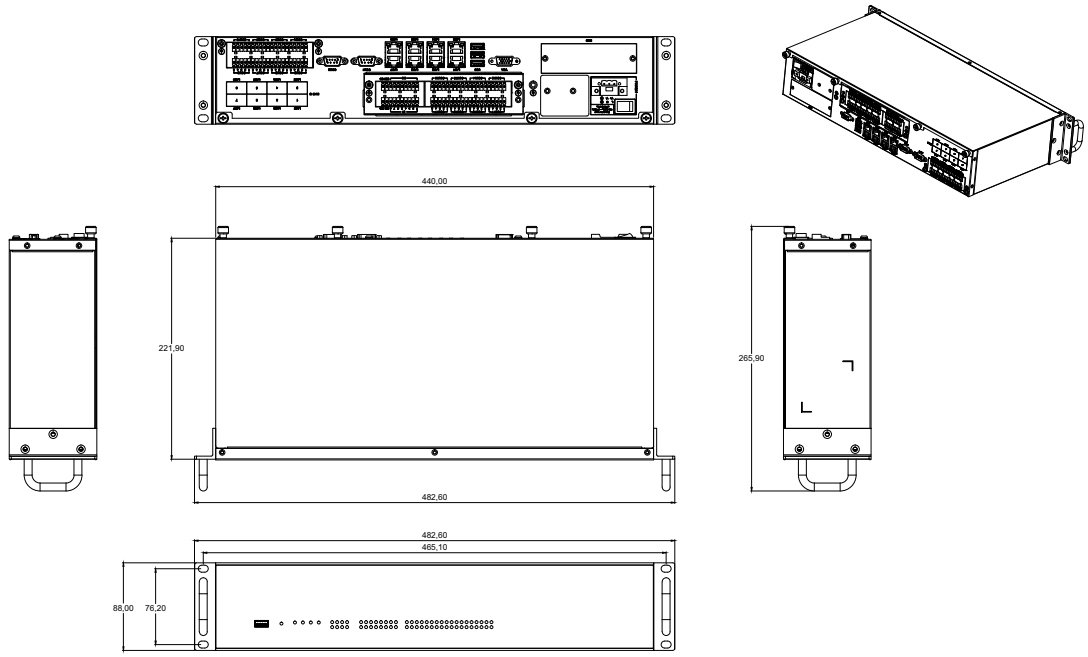


Figure 1.3 ECU-4674 Series Chassis Dimensions

1.6 Packing List

The accessory package of ECU-4674 Series contains the following items:

ECU-4674-LA53SAE accessory

(A) ECU-4674-LA53SAE Product
(B) 2 x 20-pins green screw terminals
(C) 1 x 3-pins green power input terminal
(D) 16 pcs jumper shorter
(E) 2 x M3 black screws for USB clamp
(F) 1 x clamp for USB dongle
(G) M3 4pcs screws for SATA HDD installation
(H) 2 x HDD hold BRK(with black HDD Mylar)
(I) 1 x S-CH manual
(J) 1 x DVD For Product Driver and Manual DISC
(K) 1 x ROHS LIST
(L) 1 x warranty card

ECU-4674-A53SAE accessory

(A) ECU-4674-A53SAE Product
(B) 2 x 10-pins green screw terminals
(C) 4 x 20-pins green screw terminals
(D) 1x3-pins green power input terminal
(E) 32 pcs jumper shorter
(F) 2 x M3 black screws for USB clamp
(G) 1 x clamp for USB dongle
(H) M3 4pcs screws for SATA HDD installation
(I) 2 x HDD hold BRK(with black HDD Mylar)
(J) 1 x S-CH manual
(K) 1 x DVD For Product Driver and Manual DISC
(L) 1 x ROHS LIST
(M) 1 x warranty card

Chapter 2

Hardware Function

This chapter shows how to setup the ECU-4674 Series's hardware functions, including connecting peripherals, setting jumpers and indicators.

Sections include:

- Overview
- LED Indicators
- Power Input
- RS-232 Interface
- RS-232/485 Interface
- DI/DO Interface
- IRIG Interface
- LAN / Ethernet Connector
- USB Ports
- VGA Display
- Advanced Watchdog Timer
- PCI-104
- iCDManager

2.1 Overview

The following figures show the indicators and connectors on ECU-4674 Series. The following sections give you detailed information about function of each peripheral.

2.1.1 ECU-4674 (8LAN\10COM) LED and Interface Position

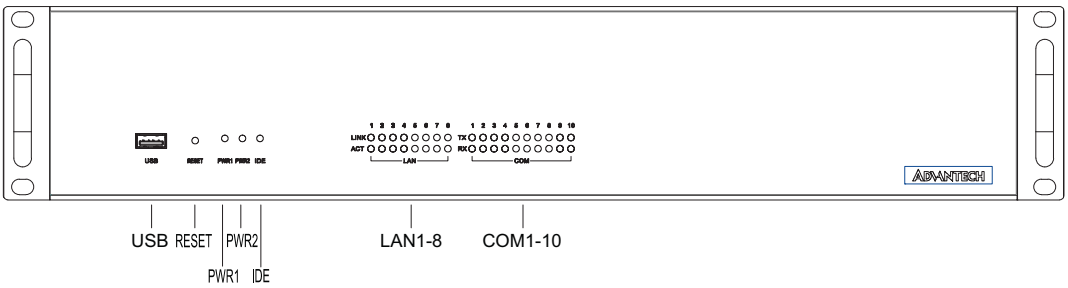


Figure 2.1 ECU-4674 (8LAN\10COM) Front Panel

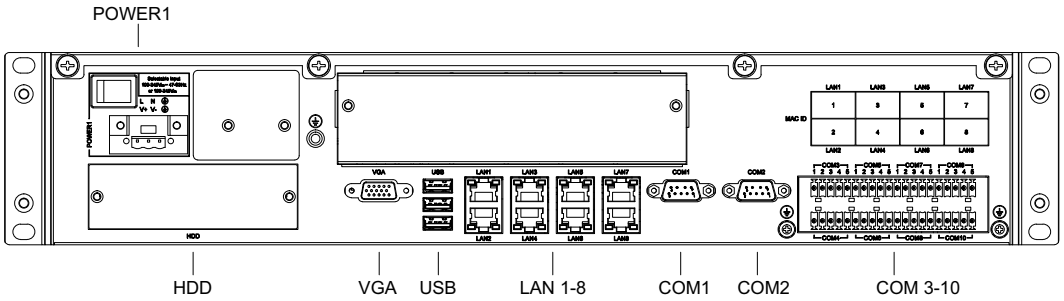


Figure 2.2 ECU-4674 (8LAN\10COM) Rear Panel

2.1.2 ECU-4674 (8 LAN\18 COM) LED and Interface position

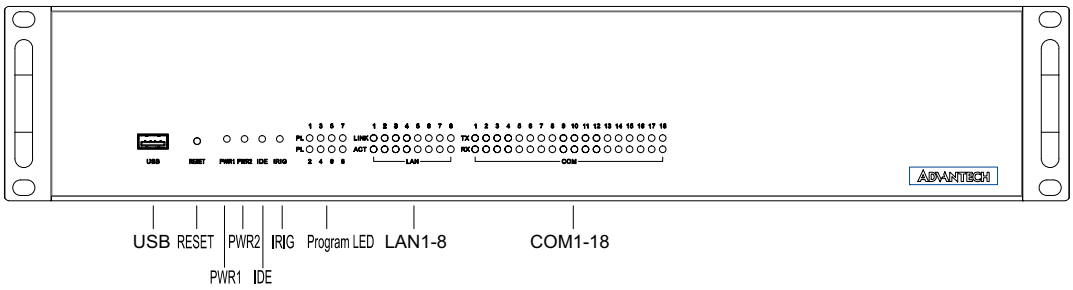


Figure 2.3 ECU-4674 (8LAN\18COM) Front Panel

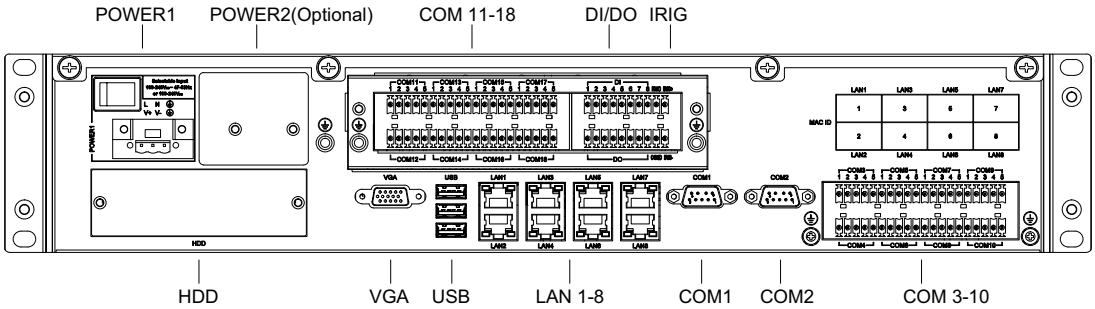
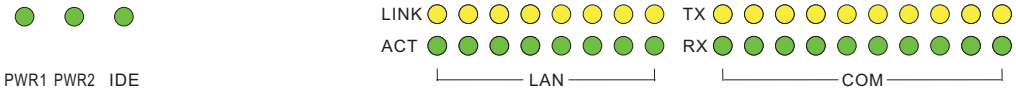


Figure 2.4 ECU-4674 (8LAN\18COM) Rear Panel

2.2 LED Indicators

2.2.1 ECU-4674 (8LAN\10COM) LED Indicators:

The LEDs in the front panel can be divided into 3 groups.



2.2.1.1 System Status Indicators

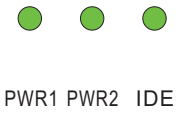


Table 2.1: Definition of System Status Indicators

Item	LED	Status	Description
1	PWR1	Green	System power1 is on
		Off	System power1 is off
2	PWR2 (Optional)	Green	System power2 is on
		Off	System power2 is off
3	IDE	Green	Data being received/ transmitted between storage devices
		Off	No Data being received/ transmitted between storage devices

Note! *Front Panel PWR2 LED is reserved for ECU-4674 (8LAN\10COM) when the customer choose dual power to supply.*

2.2.1.2 LAN Status Indicators

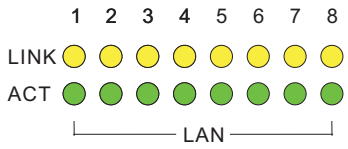
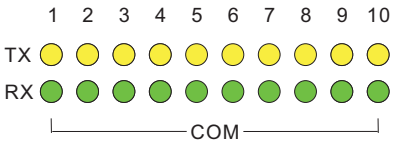


Table 2.2: Definition of LAN Status Indicators

Item	LED	Status	Description
1	LAN/ LINK (Port 1~2)	Green	1Gbps network link
		Orange	100Mbps network link
		Off	10Mbps network link or invalid network link
2	LAN/ ACT (Port 1~2)	Green	Ethernet date being received/ transmitted
		Off	No Ethernet data being received/ transmitted
3	LAN/ LINK (Port 3~8)	Orange	100Mbps network link
		Off	10Mbps network link or invalid network link
4	LAN/ ACT (Port 3~8)	Green	Ethernet date being received/ transmitted
		Off	No Ethernet data being received/ transmitted

2.2.1.3 Serial Communication Status Indicators



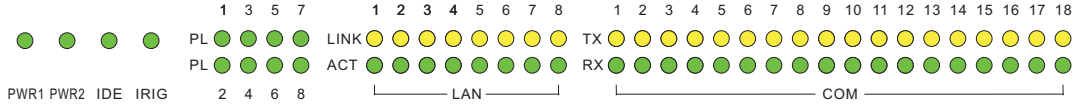
ECU-4674 (10COM) Serial Communication Status Indicators:

Table 2.3: Definition of Serial COM Status Indicators

Item	LED	Status	Description
1	COM/Rx (Port 1 ~ 10)	Green	Serial port data being received
		Off	No data being received
2	COM/Tx (Port 1 ~ 10)	Orange	Serial port data being transmitted
		Off	No data being transmitted

2.2.2 ECU-4674 (8LAN\18COM) LED Indicators

The LEDs in the front panel can be divided into 4 groups.



2.2.2.1 System Status Indicators

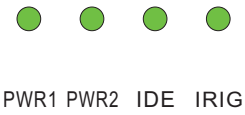
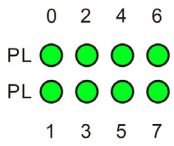


Table 2.4: Definition of System Status Indicators

Item	LED	Status	Description
1	PWR	Green	System power1 is on
		Off	System power1 is off
2	PWR2 (Optional)	Green	System power2 is on
		Off	System power2 is off
3	IDE	Green	Data being received/ transmitted between storage devices
		Off	No Data being received/ transmitted between storage devices
4	IRIG	Green	IRIG-B signal being received
		Off	No IRIG-B signal being received

Note! *Front Panel PWR2 LED is reserved for ECU-4674 (8LAN\10COM) when the customer choose dual power to supply.*

2.2.2.2 Programmable LED



The ECU-4674 Series products provide eight programmable LED indicator lights, is convenient for the user through the API control the Programmable LED state (green, off), can be used to indicate and detecting user according to their actual needs to edit this machine operation status, a detailed explanation of the LED API ECU-4674 Series please refer to the product CD://ECU-4674 Series/Driver/Windows Driver/ IRIG Driver/PCIIRIG_User_Interface.chm

Table 2.5: Programmable LED Status Indicators

LED	Status	Description
PL (0~7)	Green	Customers can according to the actual need to define the Programmable LED state
	Off	

Users can program DIO function with the API function and detailed parameter can refer to the software help document.

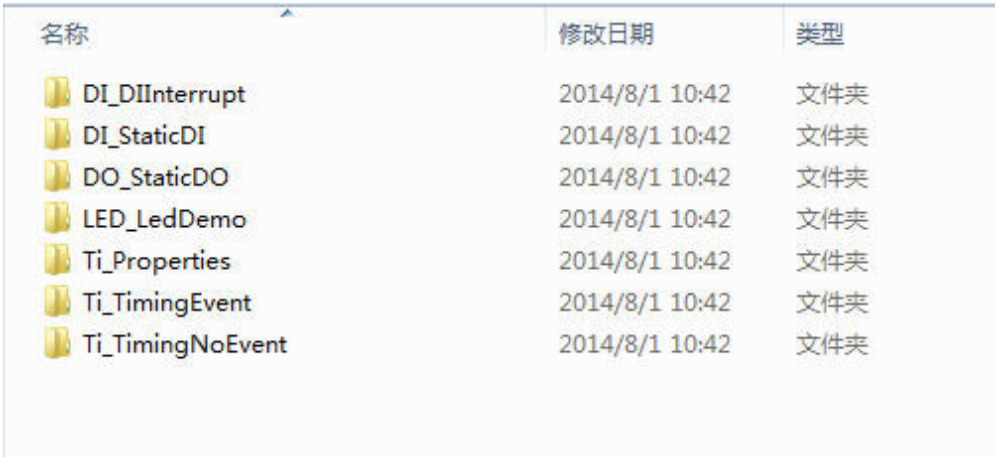
Users can set LED status by programming API interface (0-7), set LED channel to 1 (ON) while others are set to 0 (OFF).

Data(HEX)	PL7	PL6	PL5	PL4	PL3	PL2	PL1	PL0
01	0	0	0	0	0	0	0	1
02	0	0	0	0	0	0	1	0
04	0	0	0	0	0	1	0	0
08	0	0	0	0	1	0	0	0
10	0	0	0	1	0	0	0	0
20	0	0	1	0	0	0	0	0
40	0	1	0	0	0	0	0	0
80	1	0	0	0	0	0	0	0

The Advantech Programmable LED Driver provides examples, explaining how to use ECU-4674's Programmable LED with series of real examples and offering reference for users to develop their own applications. You can modify these sample applications to meet your needs. You can find these examples in the folder with installation paths of the ECU-4674 Programmable Driver

You can find the example in the below installation path:

C:\ProgramFiles\Advantech\Advantech PCIIRIG Windows Driver\SDK\Example\C++ Console



2.2.2.3 LAN Status Indicators

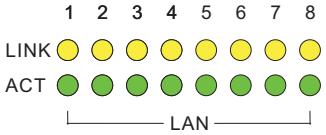


Table 2.6: Definition of LAN Status Indicators

Item	LED	Status	Description
1	LAN/ LINK (Port 1~2)	Green	1Gbps network link
		Orange	100Mbps network link
		Off	10Mbps network link or invalid network link
2	LAN/ ACT (Port 1~2)	Green	Ethernet date being received/ transmitted
		Off	No Ethernet data being received/ transmitted
3	LAN/ LINK (Port 3~8)	Orange	100Mbps network link
		Off	10Mbps network link or invalid network link
4	LAN/ ACT (Port 3~8)	Green	Ethernet date being received/ transmitted
		Off	No Ethernet data being received/ transmitted

2.2.2.4 Serial Communication Status Indicators

ECU-4674 (8LAN\18COM) Serial Communication Status Indicators:

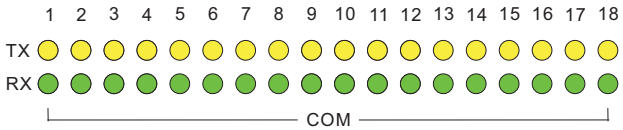


Table 2.7: Definition of Serial COM Status Indicators

Item	LED	Status	Description
1	COM/Rx (Port 1 ~ 18)	Green	Serial port data being received
		Off	No data being received
2	COM/Tx (Port 1 ~ 18)	Orange	Serial port data being transmitted
		Off	No data being transmitted

2.3 Power Input

ECU-4674 Series product support single power input AC or DC, It is reserved for dual power supply input interface, to facilitate customer to extend using dual power specifications.

Table 2.8: Power Input

Item	AC/DC	Volt. Range	Power Rating	Connector Type
PWR1	AC	100-240 VAC	0.35A(max)~0.05A(min), 47-63 Hz	3Pin Screw Terminal
	DC	100-240 VDC	0.35(max)~0.05A(min)	3Pin Screw Terminal

The function of each part is described as below:

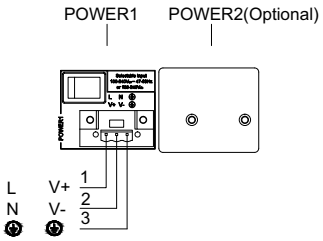


Table 2.9: AC/DC Power Input PIN Definition

Pin	Screen printing	Function Description
1	L/V+	PWR1 L/PWR1 V+ AC/DC power input PIN
2	N/V-	PWR1 N/PWR1 V- AC/DC power input PIN
3	⏚	GND

Note! *If the customer expansion of the use of dual power supply, power input specifications refer to Table2.10.*

Table 2.10: Power Input

Item	AC/DC	Volt. Range	Power Rating	Connector Type
PWR1	AC	100-240 V	0.35A(max)~0.05A(min) 47-63 Hz	3Pin Screw Terminal
	DC	100-240 V	0.35(max)~0.05A(min)	3Pin Screw Terminal
PWR2	AC	100-240 V	0.35A(max)~0.05A(min) 47-63 Hz	3Pin Screw Terminal
	DC	100-240 V	0.35(max)~0.05A(min)	3Pin Screw Terminal

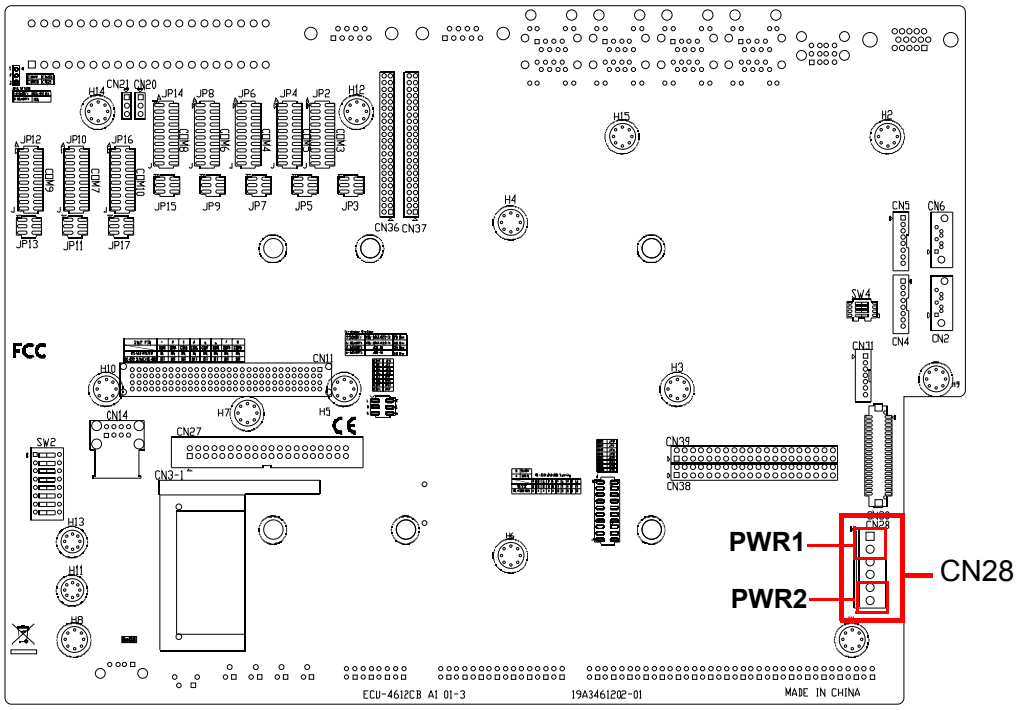


Figure 2.5 Power1&2 input location(CN28)

2.4 RS-232 Interface (COM1,COM2)

The ECU-4674 Series offers two standard RS-232 serial communication interface port: COM1 and COM2. Please refer to A.1 for pin assignments. The IRQ and I/O address of COM1 and COM2 are listed below:

Table 2.11: IRQ and I/O Address for COM1,COM2

COM No.	IRQ	I/O Address
COM1	IRQ4	03F8
COM2	IRQ3	02F8

2.5 RS-232/485 Interface (COM3~COM18)

The ECU-4674 Series offers 8 or 16 RS-232/485 serial communication interface ports: COM3 to COM18. Please refer to Appendix A.2 for their pin assignments. Users can select each port for RS-232 or RS-485 through the different connection

2.5.1 OxPCIe958 UARTs with 128 bytes FIFO

Advantech ECU-4674 Series comes with Oxford OxPCIe958 UARTs containing 128 bytes FIFO.

2.5.2 RS-232/485 Detection

In RS-232/485 mode, ECU-4674 Series automatically detects signals to match RS-232 or RS-485 networks. (No jumper change required)

2.5.3 Automatic Data Flow Control Function for RS-485

In RS-485 mode, ECU-4674 Series automatically detects the direction of incoming data. So no handshaking signal (e.g. RTS signal) is necessary. This lets you conveniently build an RS-485 network with just two wires.

2.5.4 Terminal Resistor for RS-485

The onboard termination resistor (120 ohm/300 ohm) for COM3~COM18 can be used for long distance transmission or device matching. (Default Open.) Also refer to Table 2.8 for the mapping table of Jumper and COM port

2.5.4.1 COM (3~10) RS-485 terminal resistor setting instructions

Table 2.12: Jumper Setting of Terminal Resistor (For COM (3~10))

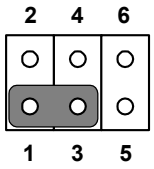
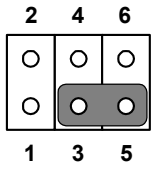
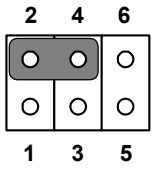
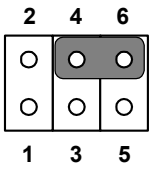
		Description
JP3 JP5 JP7 JP9 JP11 JP13 JP15 JP17		Add 120 ohm terminal resistor on Data+/Data- of RS-485 Add 120 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)
		Add 300 ohm terminal resistor on Data+/Data- of RS-485 Add 300 ohm termial resistor on Rx+/Rx- of RS-422 (optional)
		Add 120 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)
		Add 300 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)

Table 2.13: Mapping Table of Jumper for COM (3~10) Port

COM port	Jumper for Terminal Resistor
COM3	JP3
COM4	JP5
COM5	JP7
COM6	JP9
COM7	JP11
COM8	JP15
COM9	JP13
COM10	JP17

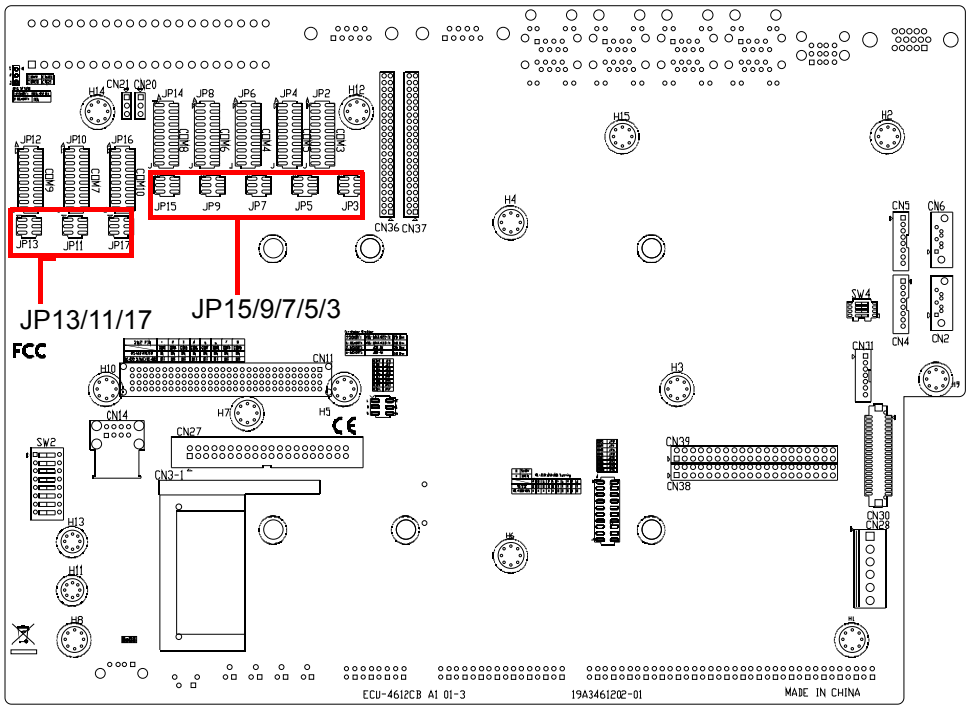


Figure 2.6 COM3~10 Port Related Jumper Locations

2.5.4.2 COM (11~18) RS-485 terminal resistor setting instructions

In order to better meet customer field for multiple com ports applications, ECU-4684-A53SAE product is another extension of 8 RS-232/485 ports, Please also refer to Table 2.14 for the COM 11~18 RS-485 mode terminal resistor setting instructions:

NOTE: For ECU-4674-A53SAE Product

Table 2.14: Jumper Setting of Terminal Resistor (For COM(11~18)

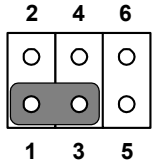
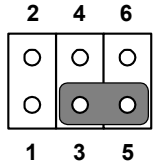
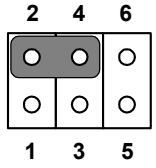
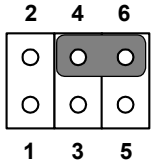
JPx		Description
JP11 JP12 JP13 JP14 JP15 JP16 JP17 JP18		Add 120 ohm terminal resistor on Data+/Data- of RS-485 Add 120 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)
		Add 300 ohm terminal resistor on Data+/Data- of RS-485 Add 300 ohm termial resistor on Rx+/Rx- of RS-422 (optional)
		Add 120 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)
		Add 300 ohm terminal resistor on Rx+/Rx- of RS-422 (optional)

Table 2.15: Mapping Table of Jumper for COM (11~18) Port	
COM port	**Jumper for Terminal Resistor**
COM11	JP11
COM12	JP12
COM13	JP13
COM14	JP14
COM15	JP15
COM16	JP16
COM17	JP17
COM18	JP18

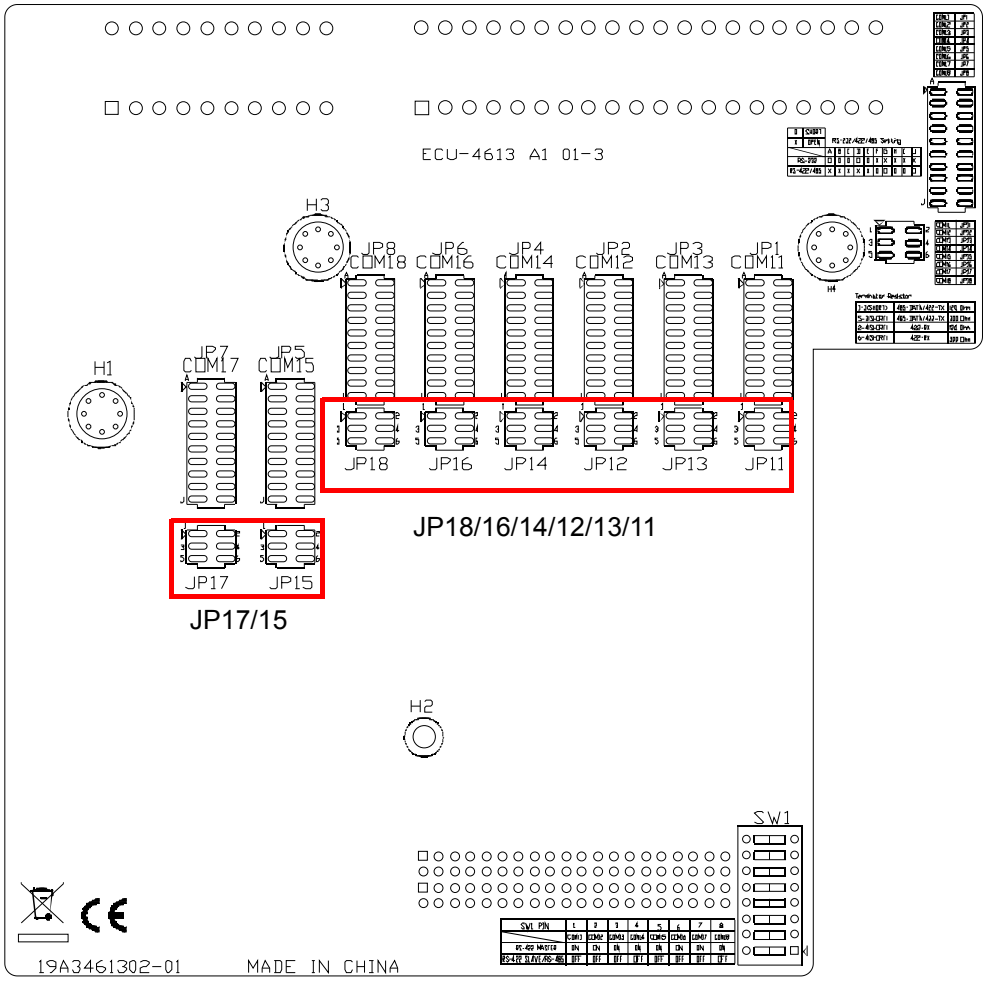


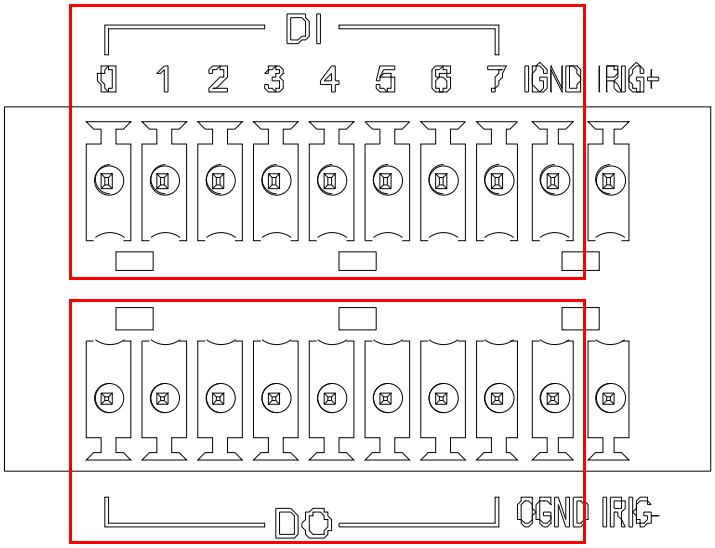
Figure 2.7 COM11~18Port Related Jumper Locations (JP11~JP18)

2.6 Digital Input/Output Interface (Optional)

There are eight digital inputs and outputs for ECU-4674 (optional).

DI/O Driver is included in the CD://ECU-4674 Series/Driver/Windows Driver/IRIG Driver, DI/O function please refer to the CD://ECU-4674 Series/Driver/Windows Driver/IRIG Driver/PCIIRIG_User_Interface.chm, which provides detailed description of the specific application of the DI/O configuration.

ECU-4674-A53SAE Product Chassis panel contains the DI/O pin assignment:



2.6.1 Digital Input

Isolated Digital Input:

Channels: 8-ch isolated digital input

Wet contact: Logic 0:0 ~ 3 V_{DC}; Logic 1: 10 ~ 30 V_{DC}

Isolation protect: 2000 V_{DC}, 30-50 V_{DC} over voltage protection

Opto-Isolator Response: 25 us-interrupt capable

Each of the 8 isolated digital input channels accept voltages from 10 to 30V. Eight input channels share one IGND. The following figure shows how to connect an external input source to the product's isolated inputs.

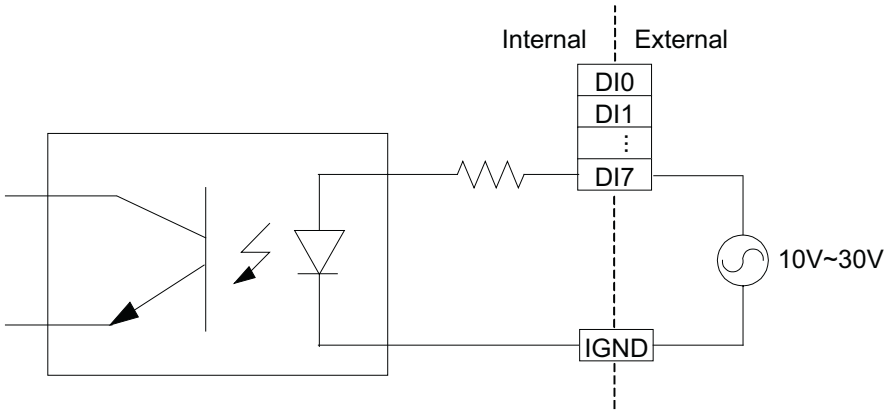


Figure 2.8 Digital input connection (wet contact)

Before you start programming install the Advantech PCIIRIG Windows Driver, this driver include DIO function.

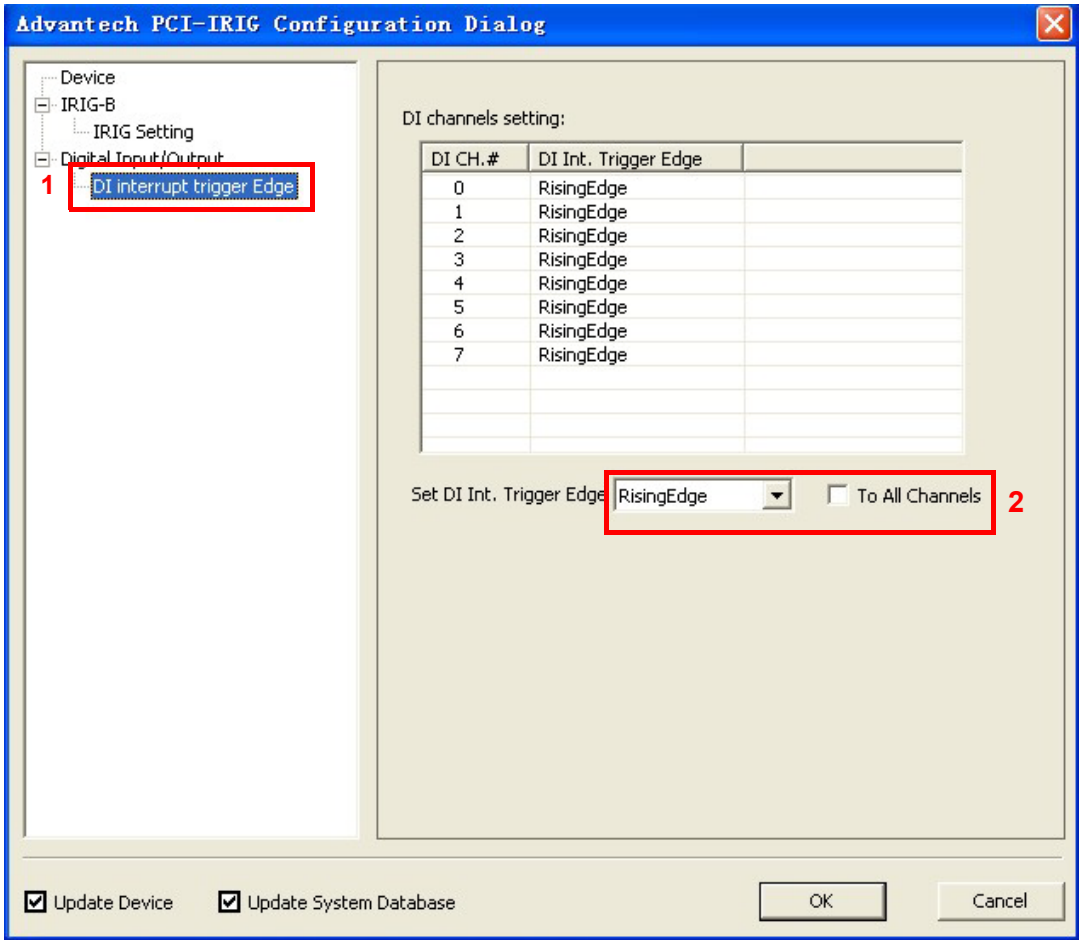
User can program DI function with the API function and detailed parameter can refer to the software help document. user should use API method to open device and get a handle to access the device firstly, then user use API method to read the data of multi DI ports according to the parameters. at last, user should use API method to close the handle created by this function.

Digital Input with Event:

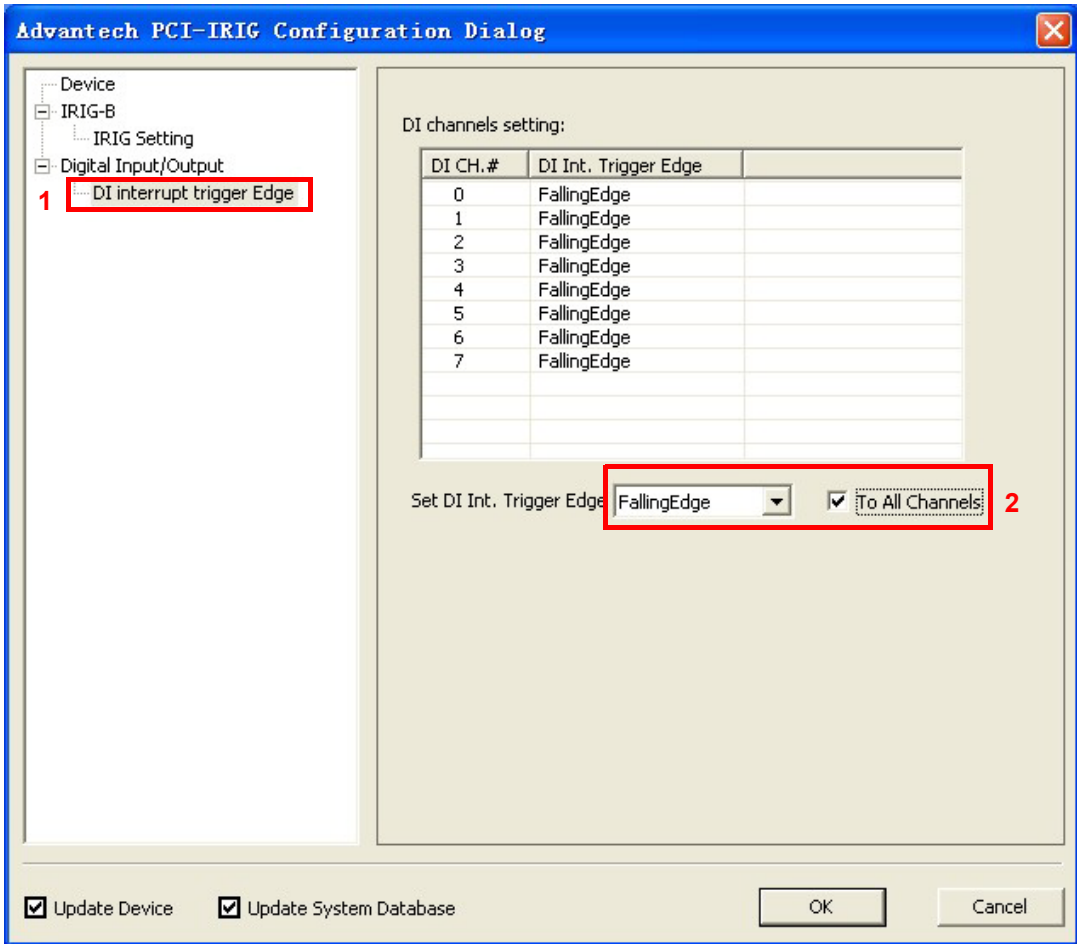
The Digital DI channels (IDI 0 and IDI 8) can be used to generate hard ware interrupts. user can program the interrupt service program to control the interrupt sources

The IRQ level is set automatically by the PCI plug and play. there is no need for users to set the IRQ level.

The interrupt can be triggered by a rising edge or a falling edge of the interrupt signal, users can use the API to select the trigger edge control.

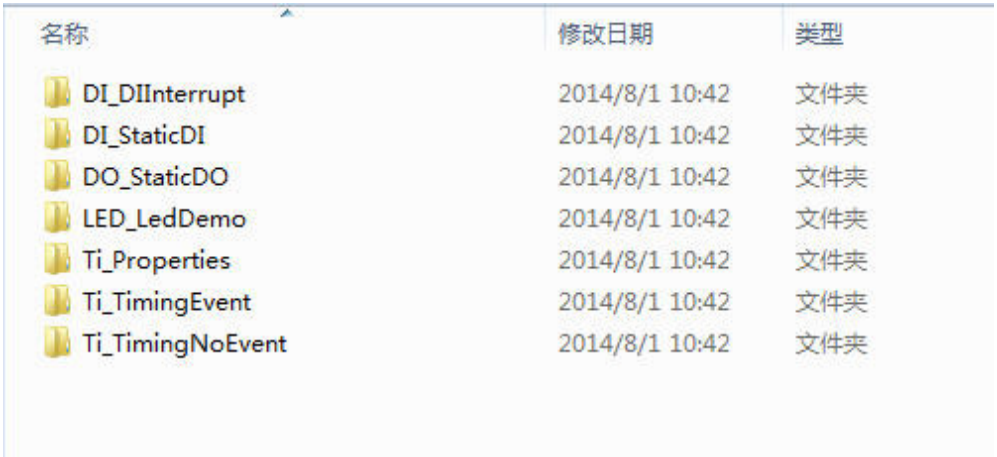


User can select DI interrupt trigger Edge item to display DI function configuration. and Set trigger edge here, RisingEdge or FallingEdge can be set.



You can find the example in the below installation path:

C:\ProgramFiles\Advantech\Advantech PCIIRIG Windows Driver\SDK\Example\C++ Console



2.6.2 Digital Output

Isolated Digital Output:

Digital Output: 8-ch isolated digital output

2000 V_{DC} isolation, 200mA max/channel sink current (normal temperature)

Keeps output status after system hot reset

Open collector to 40V (200mA maximum sink current load) 3 kHz speed

If the external voltage source (Open collector to 40V) is connected to each isolated output channel (IDO) and its isolated digital output turns on (200 mA max./ch), the card's current will sink from the external voltage source. DI/O connector provides two OGND pins for IDO connection.

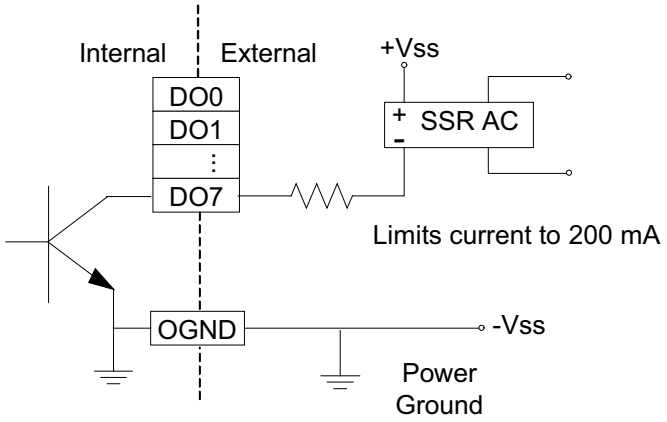


Figure 2.9 Digital output connections

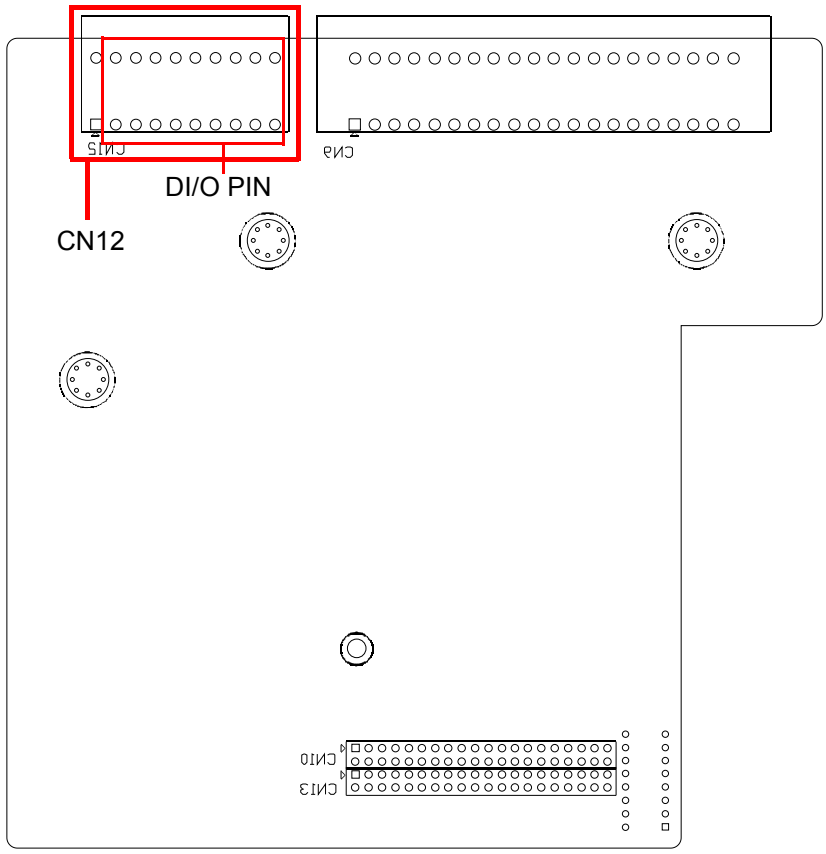


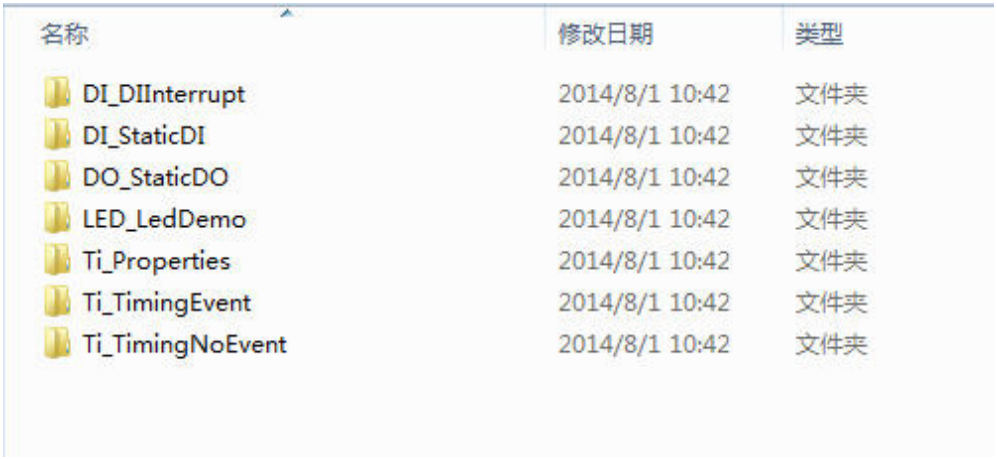
Figure 2.10 DI/O Connector (CN12-DI/O PIN) Location

Users can program DO function with the API function and detailed parameter can refer to the software help document.

The Advantech DIO Driver provides examples, explaining how to use ECU-4000's DIO with series of real examples and offering reference for users to develop their own applications. You can modify these sample applications to meet your needs. You can find these examples in the folder with installation paths of the ECU-4000 DIO Driver.

You can find the example in the below installation path:

C:\ProgramFiles\Advantech\Advantech PCIIRIG Windows Driver\SDK\Example\C++ Console



2.7 IRIG Interface (Optional)

ECU-4674 series Product provides 1 x RS-485 IRIG-B port for system-time-synchronization, the function provides more accurate time recording information, to facilitate data analysis.

Refer to the CD://ECU-4674 Series/Driver/Windows Driver/IRIG Driver/PCIIRIG_User_Interface.chm, which provides detailed description of the specific application of the IRIG configuration.

ECU-4674 series Product Chassis panel contains the IRIG pin assignment:

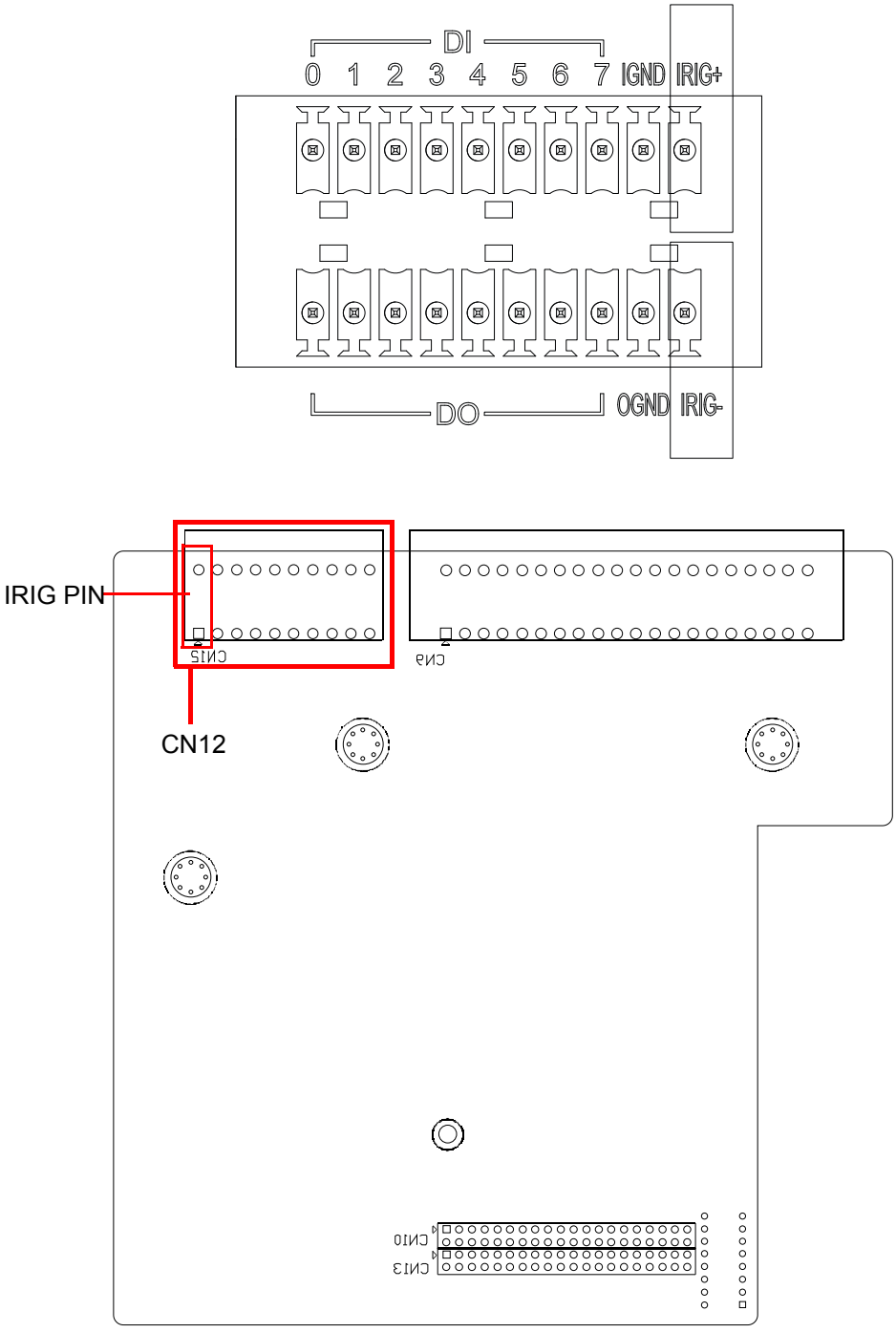
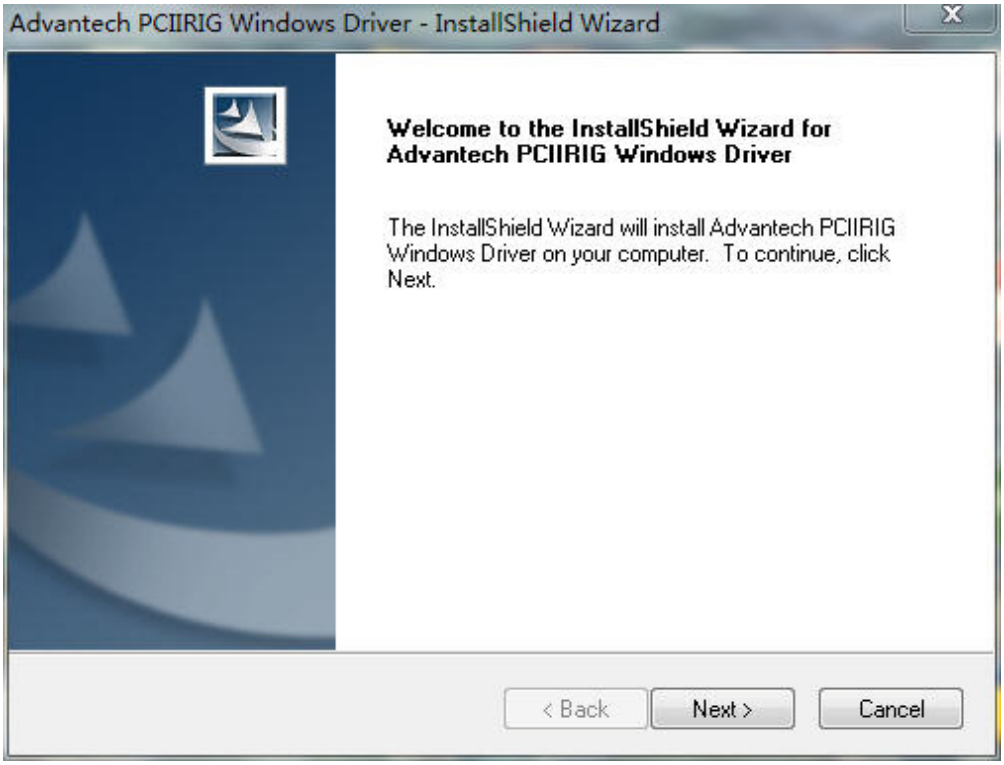


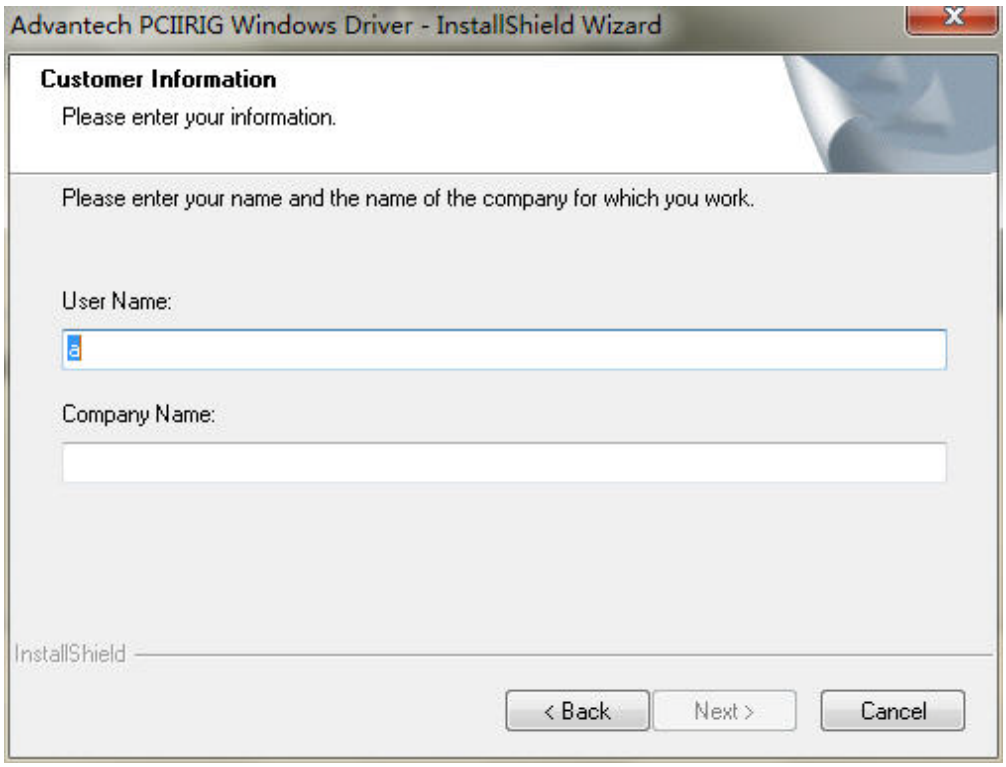
Figure 2.11 IRIG Connector (CN12-IRIG PIN) Location

Before you start programming, install the Advantech PCI IRIG Windows driver, this driver include DIO and Program LED function.

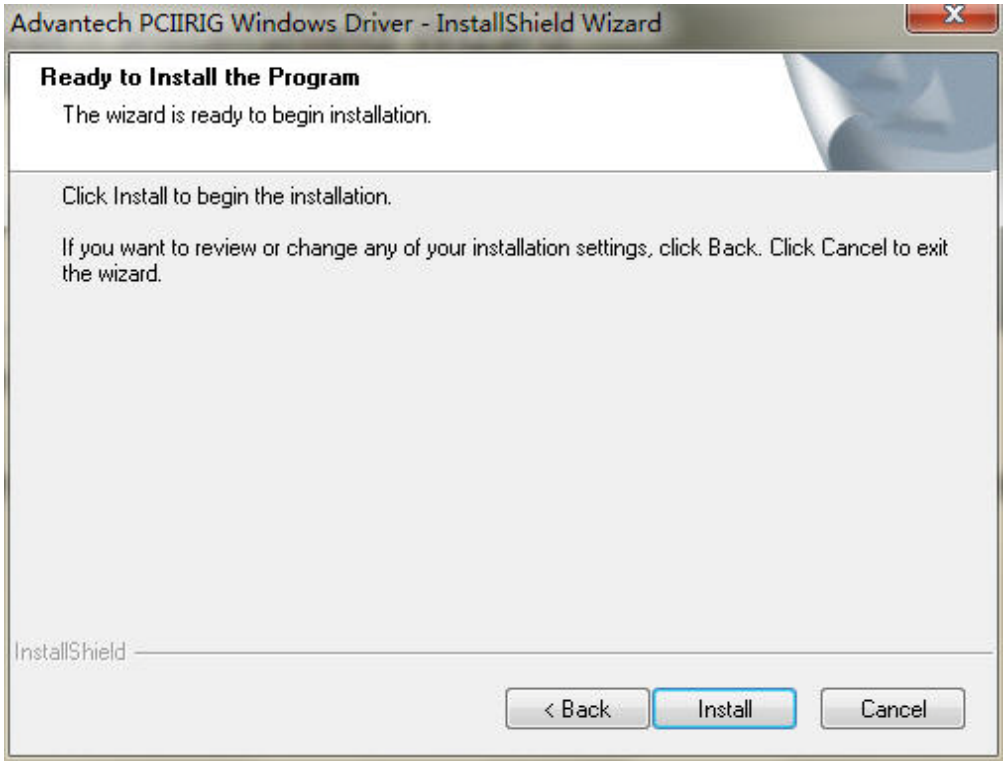
1. install the Advantech PCI IRIG Windows Driver


Advantech PCIIRIG Windows Driver - InstallShield Wizard
Welcome to the InstallShield Wizard for Advantech PCIIRIG Windows Driver
The InstallShield Wizard will install Advantech PCIIRIG Windows Driver on your computer. To continue, click Next.
< Back
Next >
Cancel

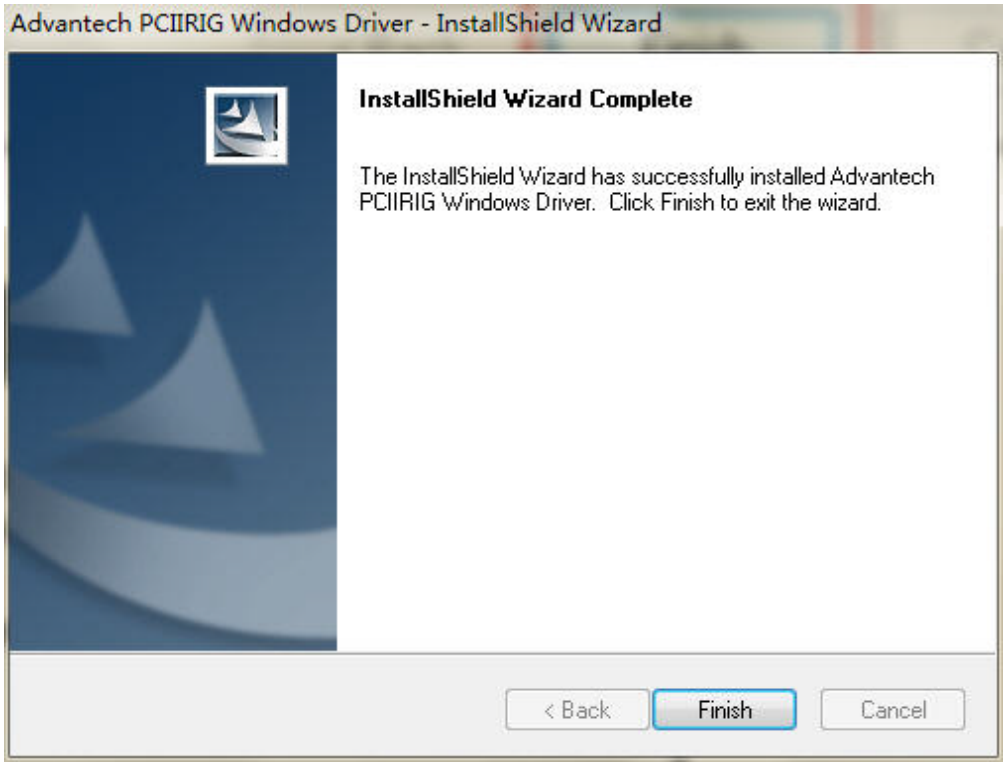
2. Input your name and name of your company.

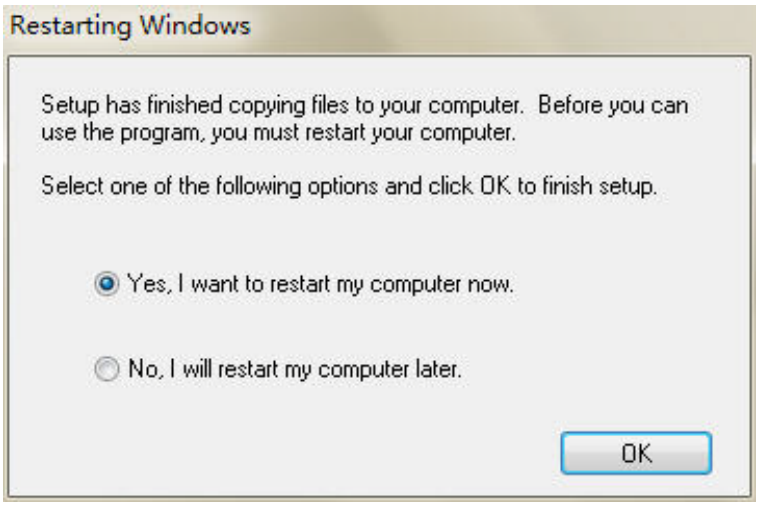

Advantech PCIIRIG Windows Driver - InstallShield Wizard
Customer Information
Please enter your information.
Please enter your name and the name of the company for which you work.
User Name:
Company Name:
InstallShield
< Back
Next >
Cancel

3. Select the install button for the next step.


Advantech PCIIRIG Windows Driver - InstallShield Wizard
Ready to Install the Program
The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield
< Back
Install
Cancel

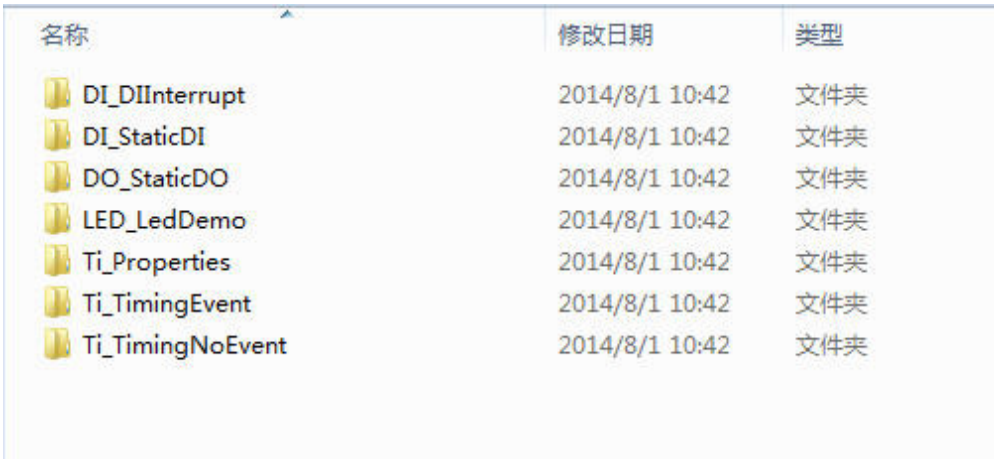
4. Select the <finish >button and restart the computer.


Advantech PCIIRIG Windows Driver - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Advantech PCIIRIG Windows Driver. Click Finish to exit the wizard.
< Back
Finish
Cancel


Restarting Windows
Setup has finished copying files to your computer. Before you can use the program, you must restart your computer.
Select one of the following options and click OK to finish setup.
Yes, I want to restart my computer now.
No, I will restart my computer later.
OK

You can find the example in the below installation path:

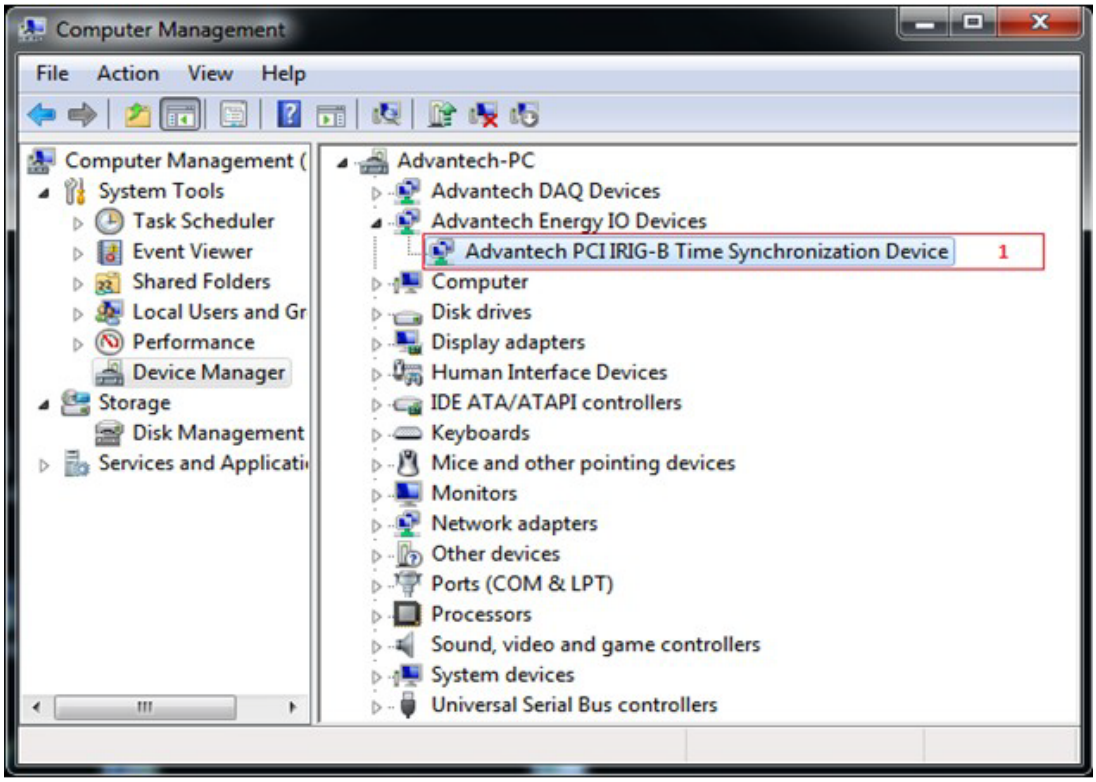
C:\ProgramFiles\Advantech\Advantech PCIIRIG Windows Driver\SDK\Example\C++ Console



Device Configuration

Device Configuration: Open Windows Device Manager

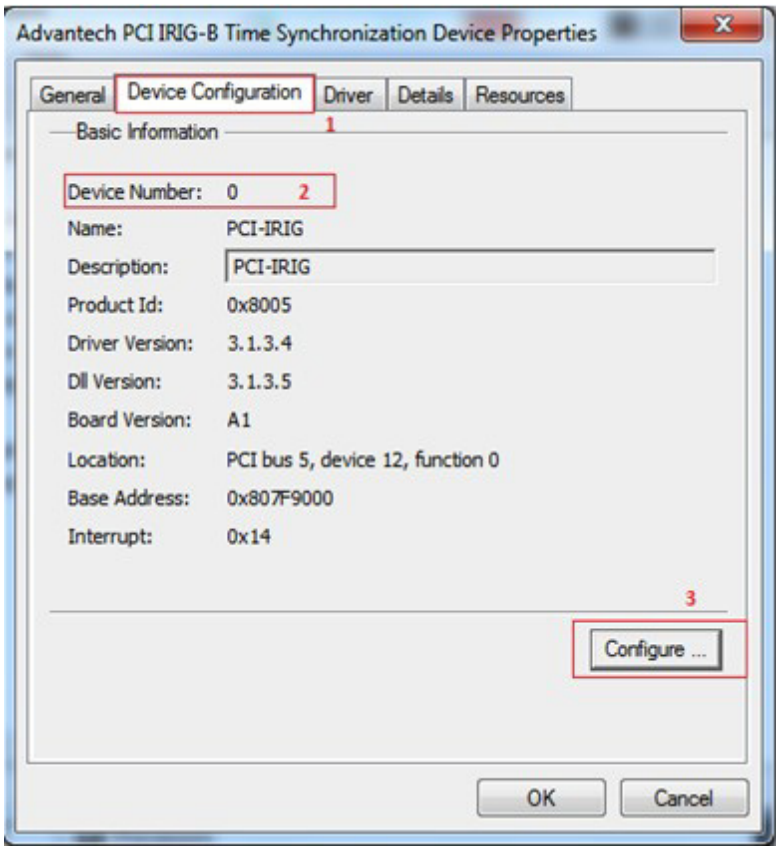
Item 1: Select IRIG device. Double click the item.



Click the Device Configuration tab page.

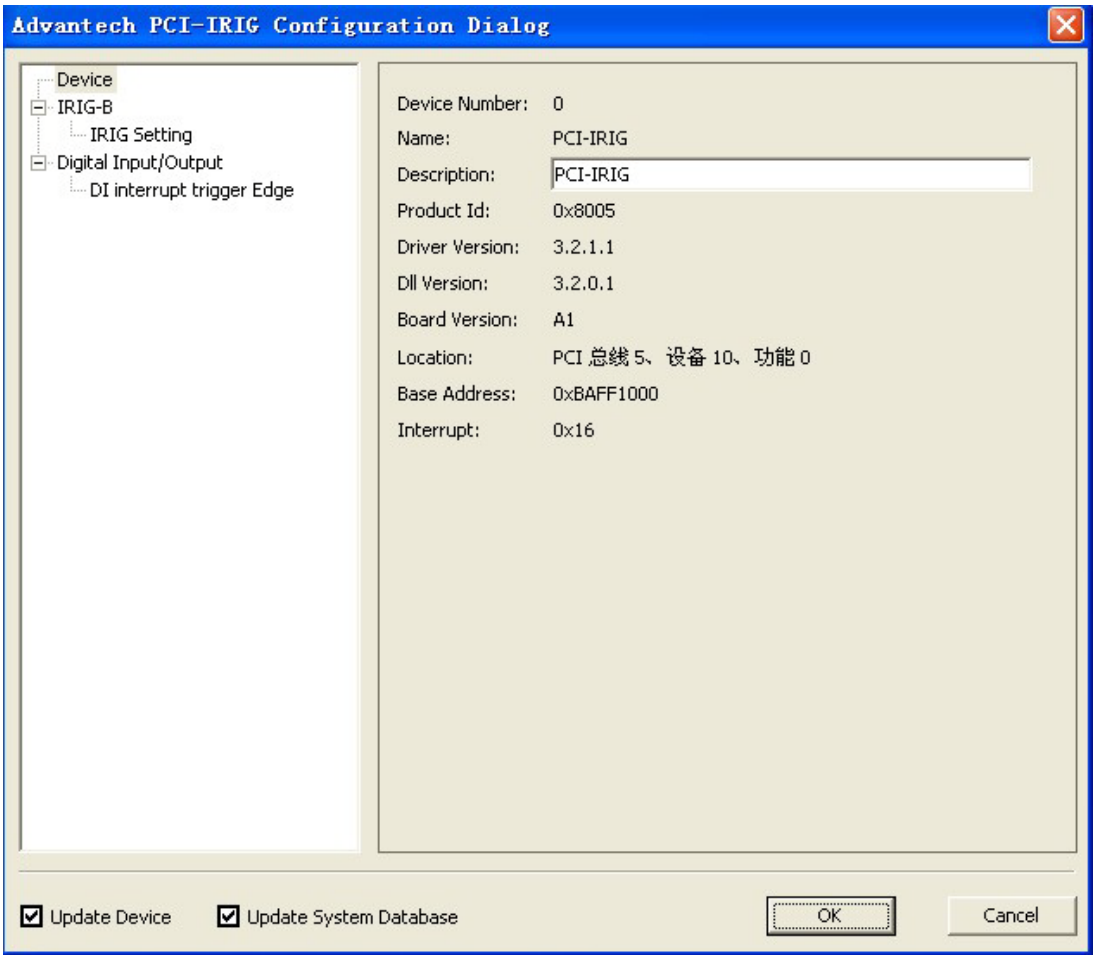
Check the device number which our API AdxIrigDeviceOpen() would use.

Click Configure... button to display configuration dialog.(Only ECU-4674 support DIO function.)

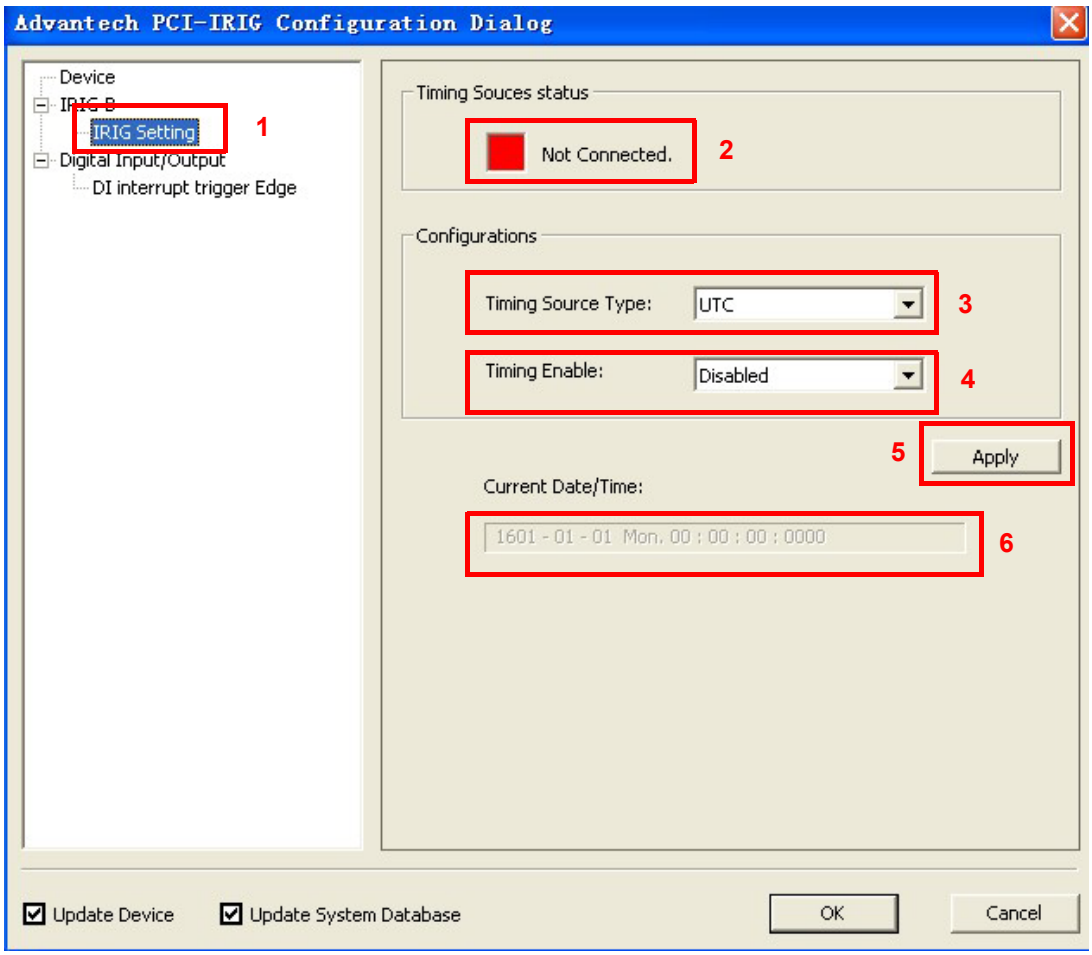


Select device item to display some device information.

Show driver version.



1. Select IRIG Setting item to display IRIG function configuration.
2. Show green if IRIG source is connected, otherwise it's red.
3. Select IRIG source time format. UTC/Local.
4. Enable/Disable adjust Windows system time function.
5. Apply the changs.
6. Show current date/time read from the IRIG device.



After configuring the below parameter,users can program the IRIG-B function with the below API. User can use API function to get IRIG time from the PCI-IRIG device. user can use API function to get or set the timing source type, UtcTime or LocalTime can be selected.

2.8 LAN: Ethernet Connector

The ECU-4674 Series product is equipped with 2 Intel 82574L Gigabit Ethernet Controller which are compliant with IEEE802.3 1000Base-T, 100Base-TX and 10Base-T (teaming function supported, IEEE-1588 hardware capability), And it is also equipped with 6 Realtek RTL8100CL Network controllers which are compliant with IEEE802.3u 10/ 100Base-T CSMA/CD standards. The Ethernet port provides a standard RJ-45 jack on board, and LED indicators on the front side to show its Link and Active status. Please note these LAN controllers all use PCI resource, the bandwidth or throughput may be restricted by the PCI bandwidth.

2.9 USB Ports

The ECU-4674 Series provides five USB interface connectors, which provide complete Plug & Play and hot swapping for up to 127 external devices.

The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. ECU-4674 SERIES provides 1 USB port on the front panel, and 3 USB port on the rear panel. It also provides 1 USB port inside the chassis for USB dongle key.

2.10 VGA Display

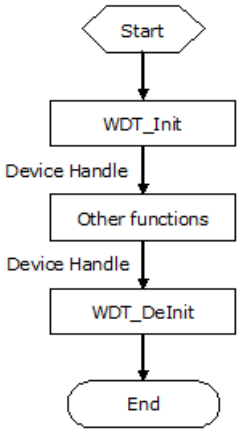
The ECU-4674 SERIES with Intel NM10, DX9, MPEG2 Decode controller, provides a resolution of 1920 x 1024 for VGA output

2.11 Advanced Watchdog Timer

The ECU-4674 SERIES provides one hardware Watchdog Timer for users to have a chance to escalate system status before the forced system reset. Users can operate system I/O port 2E and 2F to set different time. You can see Interface technique of Microcomputer or example by Advantech (Appendix B).

User can Programming Interface (API), including calling procedure of operating Watchdog device, and Control Panel Program (CPL) of the driver. The Watchdog WDM Driver allows you to easily perform versatile WDT operations through properties, methods and events in programs developed with Microsoft Visual C++ and Microsoft Visual Basic.

The following figure describes the common call flow of the Watchdog which is necessary for all WDT operations:



2.12 PCI-104

ECU-4674 SERIES supports standard PCI-104 version 1.2 expansion, which supports up to 2 PCI devices. You also could install the expansion of other functions of the PCI-104 interface to meet customer's demand. The power supply is 3.3 V, 5 V and 12 V. The System board is now required to supply all three power rails to each connector, In addition, expansion cards are now required to limit the total power drawn collectively from all three power rails to no more than 25 watts.

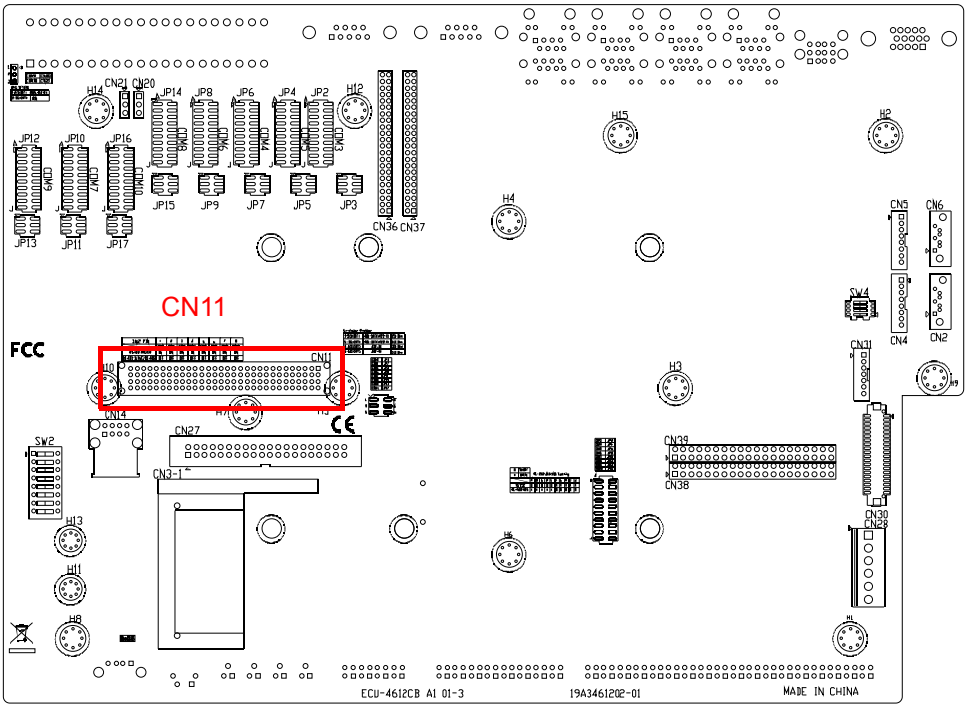


Figure 2.12 PCI-104 (CN11) Location

Table 2.16: Slot Select for PCI BUS

Module Slot	REQ#	GNT#	CLK
0	REQ0#	GNT0#	CLK0
1	-	-	CLK1

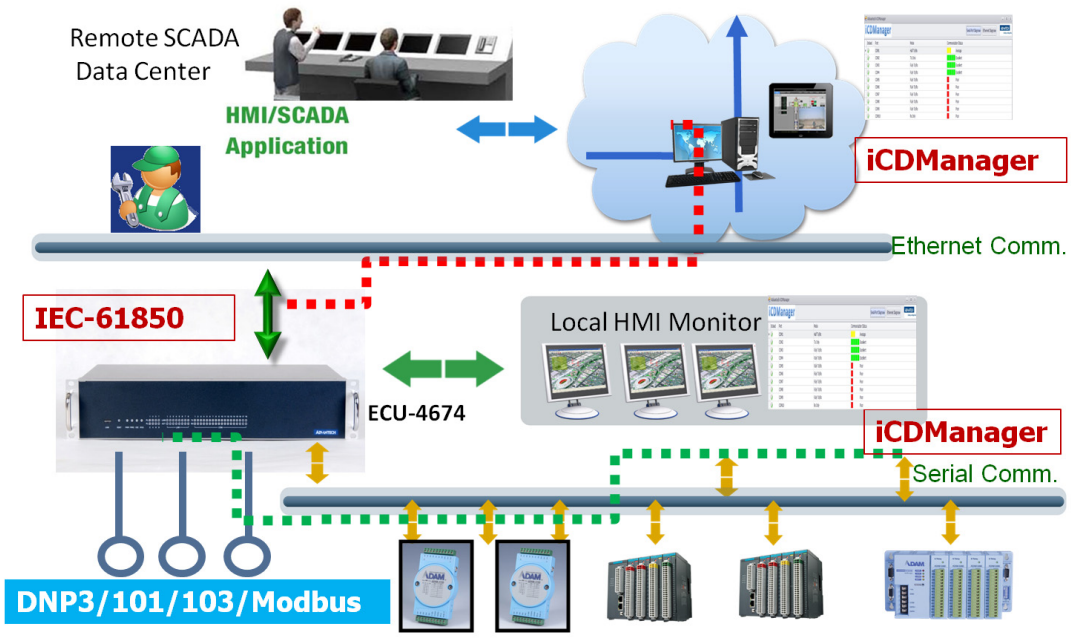
2.13 iCDManager (Intelligent Connectivity Diagnose Manager)

As you know, the substation communication gateway play the important roles, which communicate with the more intelligent device in the smart substation , Suppose the remote SCADA operator find that there are some communication issue with the substation gateway , which may occurred in the remotely substation, because the substation is located in the remote suburb usually , the service engineer will take the long time to get to the substation and maintain the communication issue?it will cause the high maintain cost and low efficiency.

How to help the remote SCADA operator to diagnose the communication heath issue and analyze the root cause of the communication issue?

Advantech iCDManager will provide the intelligent connectivity diagnose solution for this requirement, the remote SCADA operator can monitor the substation gateway's communication health and guide the substation field operator to examine the physical communication link or the other software application configuration by the iCDManager service.

Advantech iCDManager is the intelligent Connectivity Diagnose Manager tools, which can monitor and diagnose the Power & Energy computers 's communication status, this tools can report the communication quality and failure for the network communication issue, it can improve diagnose efficiency and save the maintain cost in the complicated network application.



2.13.1 System Structure Diagram

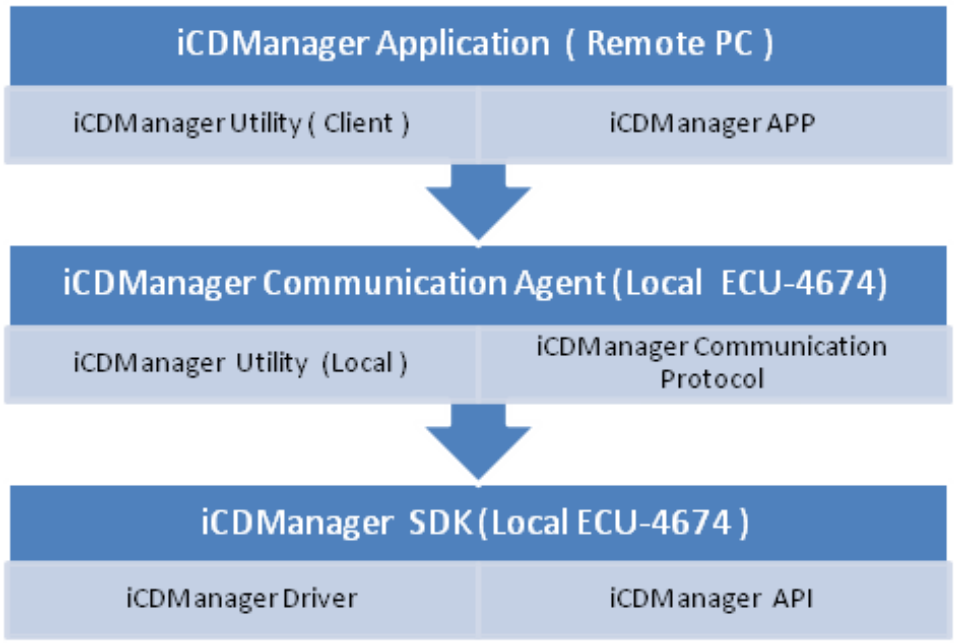


Figure 2.13 iCDManager software structure diagram

Figure 1 illustrates the iCDManager's system structure and component:

1. iCDManager SDK

The iCDManager SDK module will provide the iCDManager driver and Program API for the customer application for ECU-4674.

2. iCDManager Communication Agent

The communication Agent will run in the Power & Energy computers (ECU -4674 Series), which can communicate with the remote PC 's iCDManager Application software , this Agent will transfer the communication port status to the iCDManager application software according to the iCDManager's configuration requirement. iCDManager Utility communicate with the communication Agent by TCP/IP with ECU-4674, ECU Listening TCP Port is 7000, the Protocol format is defined by Advantech. it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status.

3. iCDManager Utility

iCDManager Utility will run in the Local ECU-4674, it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status.

4. iCDManager Application Software

iCDManager Application Software will run in the Remote SCADA PC, which can communicate with the remote ECU-4674 's iCDManager Agent, it can connect the more Power & Energy computers and monitor the multi ECU Device 's communication status by communication with iCDManager Agent 's communication protocol.

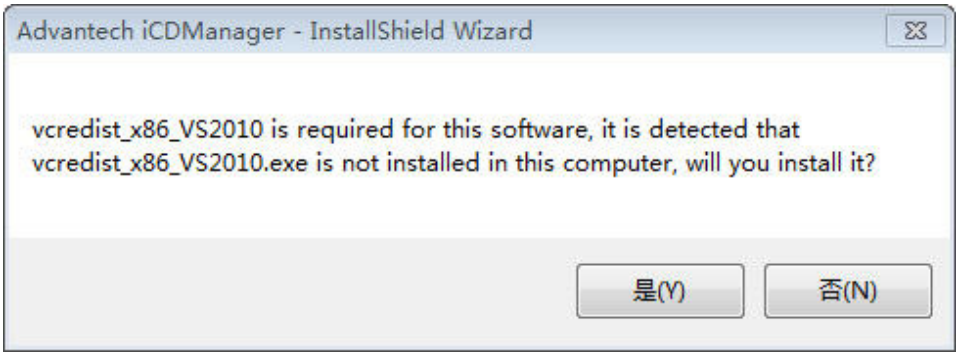
Users can configure the different communication mode and iCDManager will rate the communication quality according to the communication data transferring content.

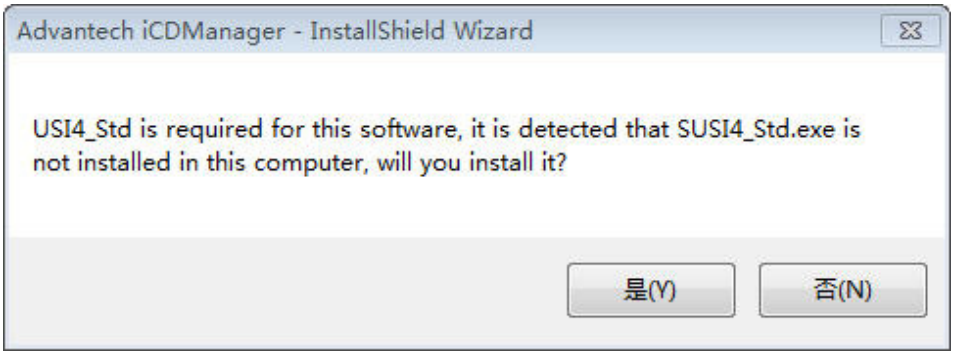
2.13.2 Installation: Install iCDManager Driver & SDK

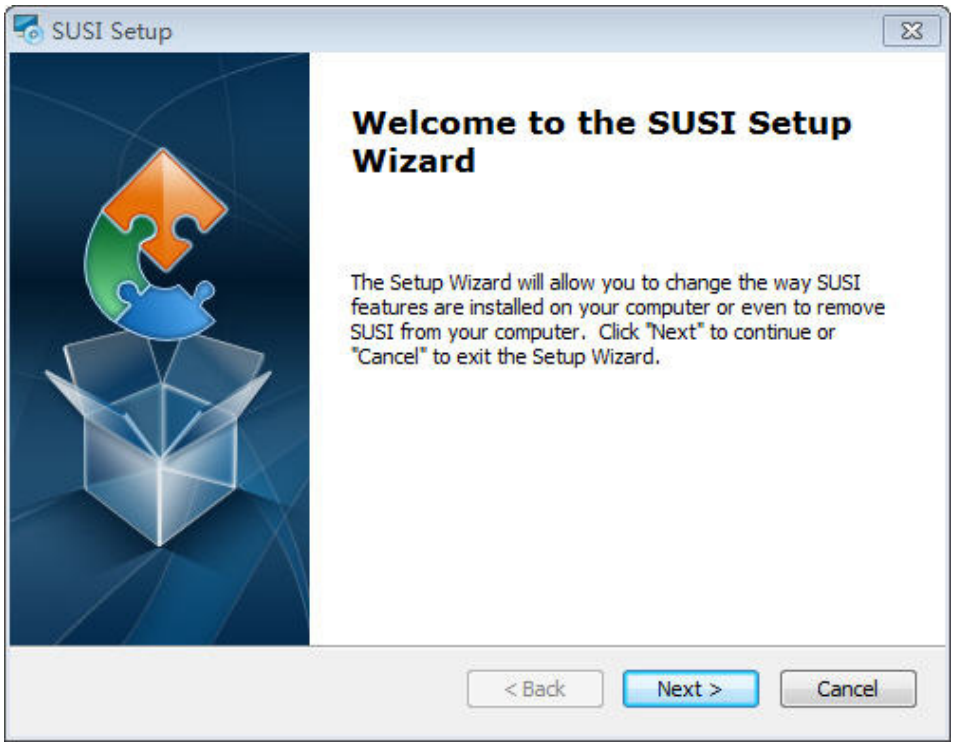
Installation is required. If there is no existing installation of Advantech iCDManager SDK on your computer, take the following steps to install Advantech iCDManager SDK.

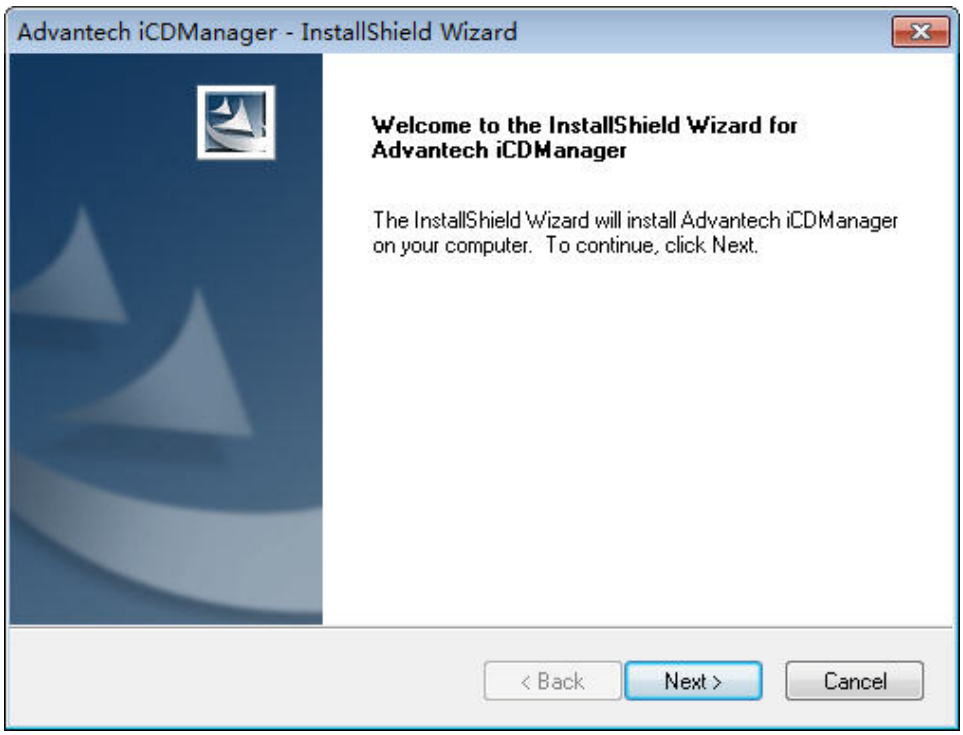
How to install Advantech iCDManager SDK

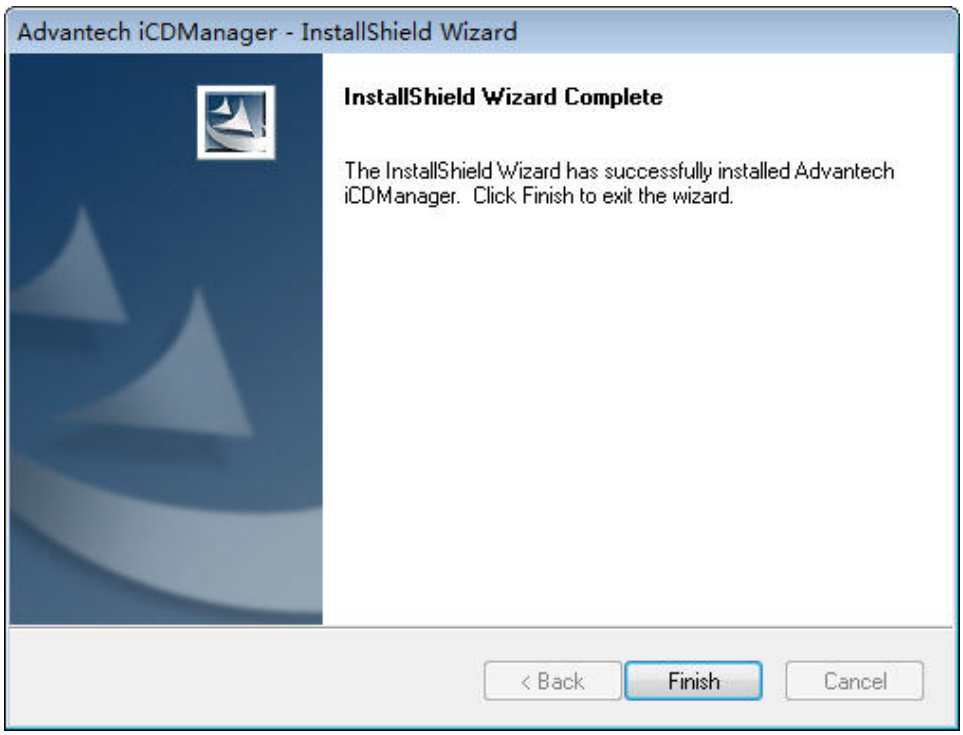
Verify that your computer meets the hardware and software requirements to run Advantech iCDManager SDK. If you do not already have a copy of the installer Advantech iCDManager driver, pls. download the installer. You can run iCDManager.exe, This will install driver and SDK of iCDManager.


Advantech iCDManager - InstallShield Wizard
vcredist_x86_VS2010 is required for this software, it is detected that vcredist_x86_VS2010.exe is not installed in this computer, will you install it?
是(Y)
否(N)


Advantech iCDManager - InstallShield Wizard
USI4_Std is required for this software, it is detected that SUSI4_Std.exe is not installed in this computer, will you install it?
是(Y)
否(N)


SUSI Setup
Welcome to the SUSI Setup Wizard
The Setup Wizard will allow you to change the way SUSI features are installed on your computer or even to remove SUSI from your computer. Click "Next" to continue or "Cancel" to exit the Setup Wizard.
< Back
Next >
Cancel


Advantech iCDManager - InstallShield Wizard
Welcome to the InstallShield Wizard for Advantech iCDManager
The InstallShield Wizard will install Advantech iCDManager on your computer. To continue, click Next.
< Back
Next >
Cancel


Advantech iCDManager - InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed Advantech iCDManager. Click Finish to exit the wizard.
< Back
Finish
Cancel

After install the iCDManager driver , you can run the iCDManager utility to monitor the Power & Energy computers 's communication status in the ECU-4674 Local terminal.

2.13.3 iCDManager for Serial Communication

For the serial communication, we will use the iCDManager to monitor the serial physical communication and get send and receive signal active status, including the RX Signal Elapsed interval, TX signal Elapsed interval, Response time interval.

iCDManager will configure the communication mode and get the com port rate result (Excellent & Good &Average & Poor).

User Should select the different serial communication mode configuration before they start up the diagnose the connectivity according to the actual requirement.

1. When the serial communication mode is configured as < Fully RX/TX >, it means that the ECU-4674 are sending and receiving the data with the serial device synchronous, there are four possible communication quality rating status as (Excellent & Good &Average & Poor). The parameter setting description is as below:
   - Communication mode: select <Fully RX/TX>
   - RX Time Span (ms): prospective normal receive time interval
   - Max RX Time Span (ms): prospective receive time interval Max.
   - TX Time Span(ms): prospective normal sending time interval
   - Max TX Time Span(ms): prospective sending time interval Max.

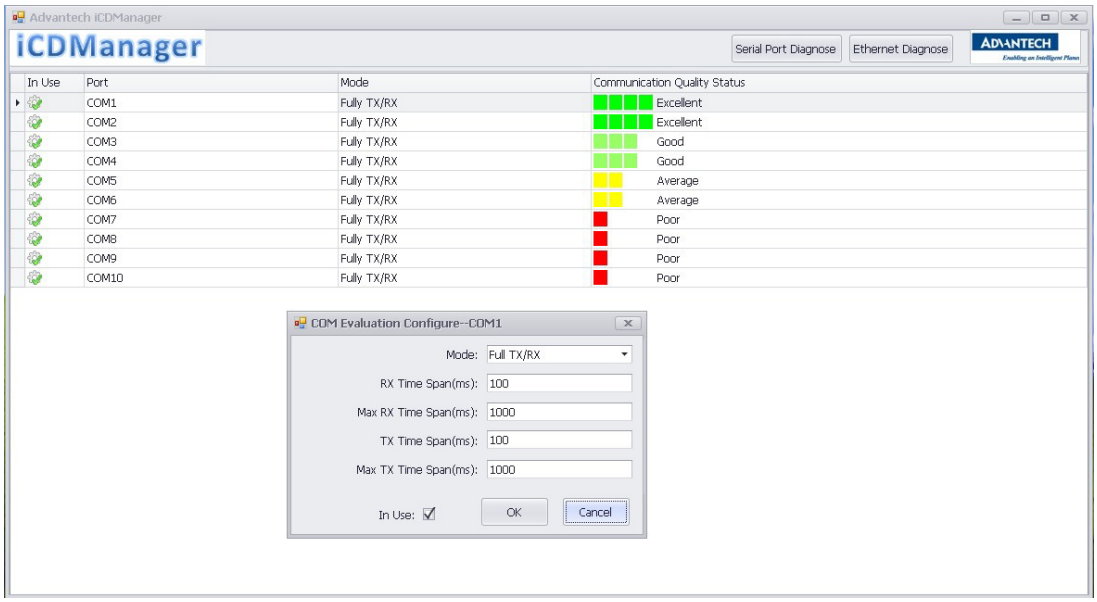
   When the actual receive time interval < RX Time Span, and when the actual sending time interval < TX Time Span, the communication quality rating will be excellent.

   When the actual receive time interval > Max RX Time Span, and when the actual sending time interval > Max TX Time Span, communication quality rating will be poor

   For the other actual receive time interval value and the actual sending time interval value, the serial communication rating will be calculated by the internal algorithm and weight.

   Parameter setting should be kept in the below range: RX Time Span >10ms, Max RX Time Span > 100 ms, RX Time Span < Max RX Time Span; TX Time Span > 10 ms, Max TX Time Span>100 ms, TX Time Span < Max TX Time Span.

   For example: When ECU-4674 's com port 1 send the data every 10 ms, the serial device on Port 2 reply the data every 10ms to ECU-4674, the communication quality rating status will be excellent.



2. When the ECU-4674's communication mode is configured as the < Half TX / RX>, it means that the ECU-4674 will request the data to the serial device, and when the ECU-4674 received the data from the serial device, then it will send the data to the serial device, there will be four possible communication quality rating status (Excellent & Good &Average & Poor).The parameter setting description is below:
   - Communication mode: select Half RX/TX
   - TX Time out (ms): prospective normal sending time interval
   - Response Time Span (ms): prospective normal response time interval
   - Max Response Time Span (ms): prospective response time interval Max.

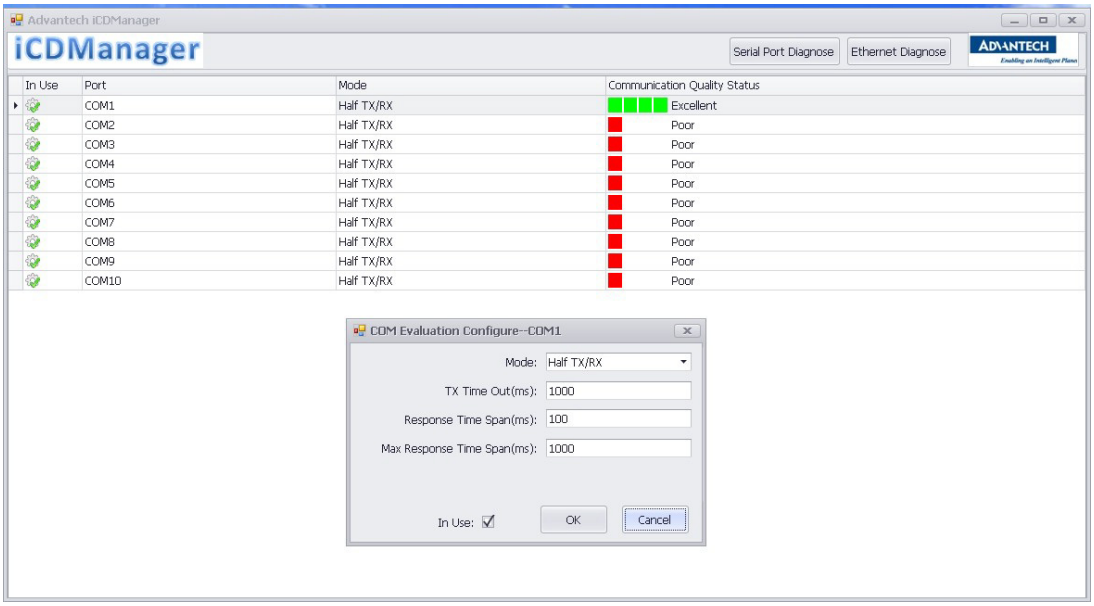
   When the actual response time interval < Response Time Span, and when the actual normal sending time interval < TX Time out, the communication quality rating will be excellent.

   When the actual response time interval > Max Response Time Span, the communication quality rating will be poor

   For the other actual response time interval value and the actual normal sending time interval value, the serial communication quality rating will be calculated by the internal algorithm and weight.

   Parameter setting should be kept in the below range: Response Time Span >10ms, Max Response Time Span >100 ms, Response Time Span < Max Response Time Span; TX Time out >10ms.

   For example: When ECU-4674 's receive the data from the serial device every 10ms, the communication quality rating status will be Excellent.



3. When the ECU-4674 's communication mode is configured as the< Tx only >, it means that the ECU-4674 will send the data to the serial device , and the serial device will not reply the data to the ECU-4674 , there will be four possible communication quality rating status as (Excellent & Good &Average & Poor).
   the parameter setting description is as below:
   - Communication mode: select <Tx only>
   - TX Time Span (ms): prospective normal sending time interval
   - Max TX Time Span (ms): prospective sending time interval Max.

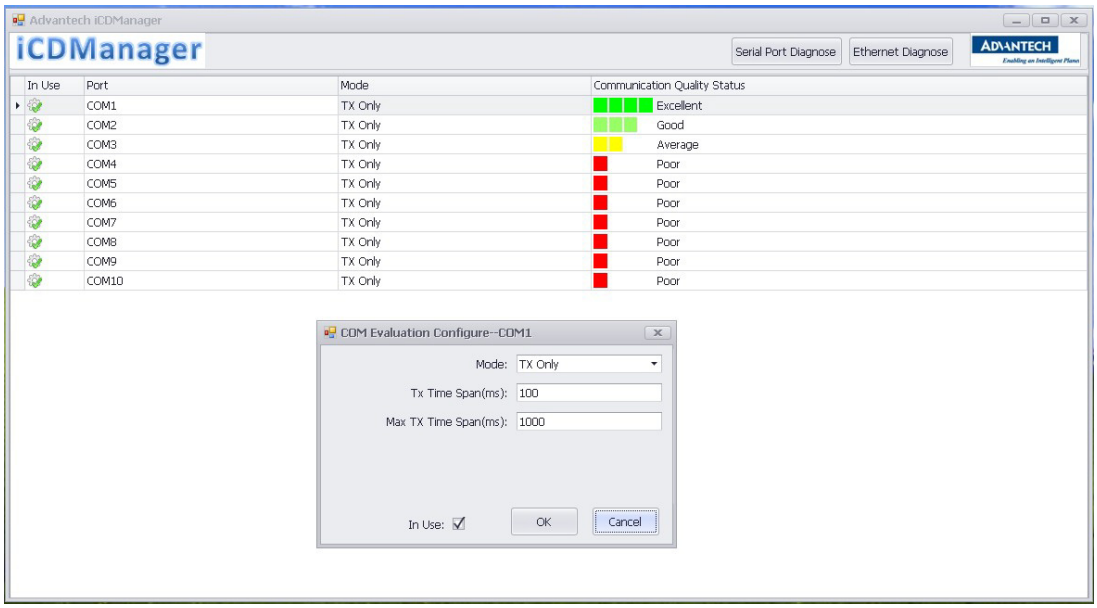
   When the actual two sending time interval < TX Time Span, the communication quality rating will be excellent.

   When the actual two sending time interval > Max TX Time Span, communication quality rating will be poor.

   For the other actual two sending interval value , the serial communication quality rating will be calculated by the internal algorithm and weight.

   Parameter setting should be kept in the below range: TX Time Span >10ms, Max TX Time Span>100 ms, TX Time Span < Max TX Time Span .

   For example: When ECU-4674 's COM1 send the data to the serial device every 10 ms, the communication quality rating status will be excellent.



4. When the ECU-4674's communication mode is configured as the <RX only> , it means that the ECU-4674 will receive the data from the serial device and will not reply the data to the serial device , there will be four possible communication quality rating status as (Excellent & Good &Average & Poor).
   The parameter setting description is as below:
   - Communication mode: select <RX only>
   - RX Time Span (ms): prospective normal receive time interval.
   - Max RX Time Span (ms): prospective receive time interval Max.

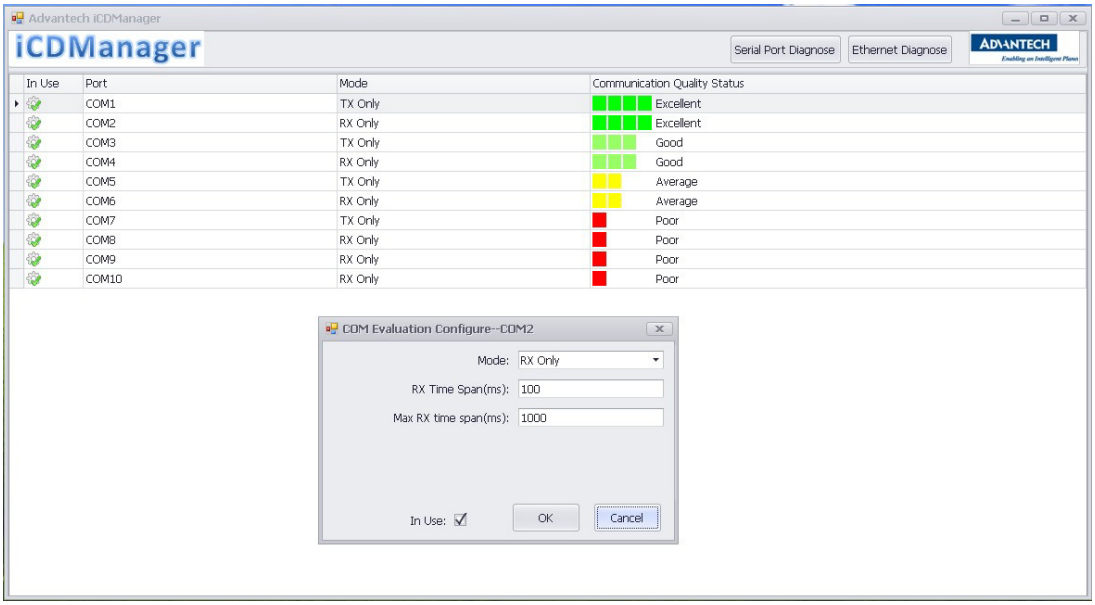
   When the actual two receive time interval < RX Time Span, the communication quality rating will be excellent.

   When the actual two receive time interval > Max RX Time Span, the communication quality rating will be poor.

   For the other actual two receive time interval value ,the serial communication quality rating will be calculated by the internal Algorithm and Weight.

   Parameter setting should be kept in the below range : RX Time Span >10ms, Max RX Time Span >100 ms, RX Time Span < Max RX Time Span .

   For example: When ECU-4674 's COM 1 receive the data from the serial device every 10ms, the communication quality rating status will be Excellent .



2.13.4 iCDManager for Ethernet Communication

For the Ethernet Communication, iCDManager will monitor the network communication status (link or down) and Link speed (10M\100\1000M) , detect the speed of the link is 100Mb/s or 10Mb/s. 100Mbs , Elapsed of Last active time interval. iCDManager will indicate if there is any activity on the link; Physical LAN link status (connected or disconnected).

iCDManager will configure the communication mode and there will be four possible communication quality rating status as (Excellent & Good & Average & Poor)

- The parameter setting description is as below:
- Normal Active Time Span (ms): the normal network Active time interval
- Max Active Time Span (ms): the Max network active time interval.

iCDManager will indicate the LAN network will be active or silent and the physical link status will be normal or abnormal.

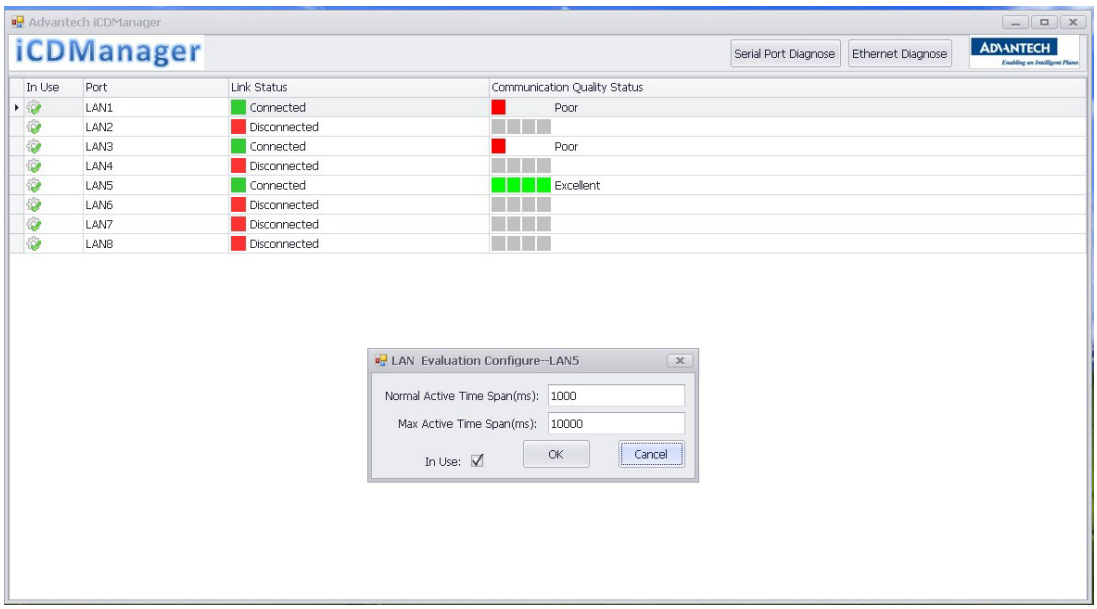
When the actual active time interval < Normal Active Time Span, the network communication quality rating will be excellent; when the actual active time interval > Max Active Time Span , the network communication quality rating will be poor.

For the other actual active time interval value, the LAN network communication quality rating will be calculated by the internal algorithm and Weight.

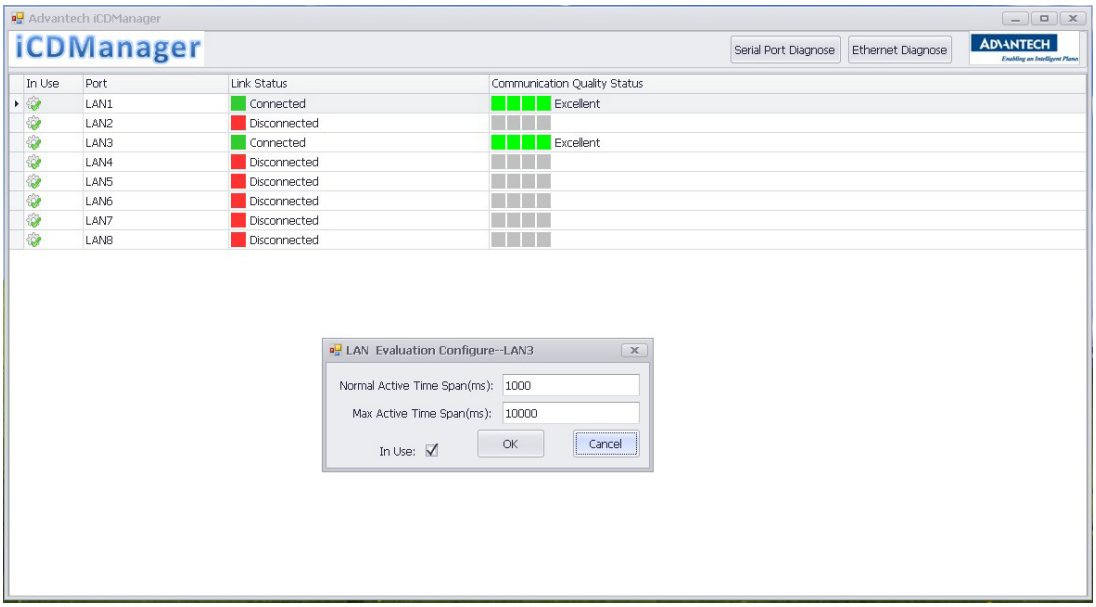
Parameter setting should be kept in the below range: Normal Active Time Span > 100 ms, Max Active Time Span >100 ms, Normal Active Time Span < Max Active Time Span.

For example: When ECU-4674 's Ethernet 1 is linked , if the network receive the data from the serial device every 1000 ms, the communication quality rating status will be Excellent

When there have no data transferring in the network, the actives and link status will change to be disconnected after 30 s, it will be no physical link.



When ECU-4674 's Ethernet LAN 1 is linked , if the network receive the data from the serial device every 1000 ms, the communication quality rating status will be Excellent.



2.14 IRIG & DIO Linux Programming and Application

You can find the Advantech DAQNavi Linux Driver in the below path: Linux driver\IRIG Driver\linux_driver_source_pciirig_Debian5.0_v3.2.0.1

This package by Advantech is a driver for Linux kernel version 2.6.26 supporting ECU series and IRIG series DAQ device.

Advantech DAQNavi Linux Drivers system requirements: Kernel version must be 2.6.26.

This driver mainly includes three parts, they are libbiodaq.so, special device user mode driver,biokernbase.ko(source code) and special device driver kernel modules (source code). The following table explains the location of the components in the package.

The following steps show how to compile and install device driver.

Installing device drivers source on Debian5.0

1. Enter "./drivers/driver_base/src/lnx_ko" directory and use make command to compile driver base kernel module source.
2. Enter "./drivers/pciirig_lnx/src/lnx_ko" directory and use make command to compile special driver kernel module source.
3. Enter "./drivers/bin" directory then use insmod command to install driver.Before the special driver kernel module is inserted, we must first insert biokernbase module.(example: sudo insmod biokernbase.ko; sudo insmod irig.ko)
4. Copy necessary library to system directory. (example: cp lib/* /usr/lib/)
5. Copy necessary header files to system directory. (example: cp inc/* /usr/include/)
6. Compile example code in './examples' and run it to check if driver work normally.

2.15 Communication Linux Programming and Application

Before you start up programming, you should install the Advantech industrial communication cards device driver for Linux Kernel 2.4.x,2.6.x,3.x firstly.

Installation step is as below:

1. Login as 'root' before executing the following instructions.
2. Uncompress the driver

   ```
   # tar zxvf adv950_vM_NN.tar.gz
   ```
3. Build the driver

   a. Build driver for 2.4 kernel

   ```
   # cd adv950_vM_NN/2.4
   # make
   ```

   b. Build driver for 2.6 kernel

   ```
   # cd adv950_vM_NN/2.6
   # make
   ```

   c. Build driver for 3.X kernel

   ```
   # cd adv950_vM_NN/3.X
   # make
   ```

Note! *To compile the source code, you must install kernel development header file package, "gcc" and "make" command. In 2.4 kernel version, you should use "ln" command to make a link named "linux-2.4" in /usr/src/, it link to you kernel development header installed folder.*

4. Install the driver module

   ```
   # make install
   ```

   to see whether ttyAPn (n = 1,2,3...) exist in /dev/ folder,

   if not, please execute the following command,

   ```
   # make node
   ```
5. Test driver and get serial port type configuration

   ```
   # make test
   ```
6. If you want the Linux insert the driver module automaticlly when boot, please follow the steps showing below

   a. Build driver

   b. For 2.4 kernel, add "insmod /path/adv950.o" to boot up shell script.

   Here the "path" is adv950.o file location path.

   c. For 2.6 and 3.X kernel, When execute "make install", the driver will be inserted into kernel automatically when boot.

   If not, please do the same as step b.

7. Uninstall the driver module and clean

   ```
   # make uninstall
   # make clean
   ```

User can program the Oxford PCI-954/952/16C950 with Advantech RS232/422/485 capacities by C++ Languages.

Chapter 3

Initial Setup

Sections include:

- Configuration
- Install a CompactFlash Card
- Installing a USB Dongle
- Installing Hard Disk
- Installation on Rack
- BIOS Setup and System Assignments

3.1 Configuration

To open the ECU-4674 Series product chassis, please follow the steps below:

1. Remove all power and signal connections
2. Place the unit heat-sink side down
3. Remove the screws shown below

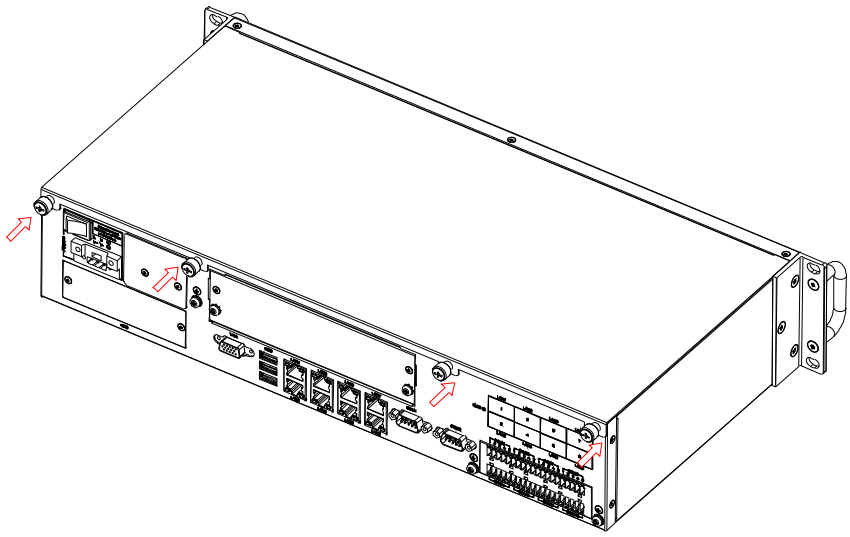


Figure 3.1 ECU-4674-LA53SAE screw location

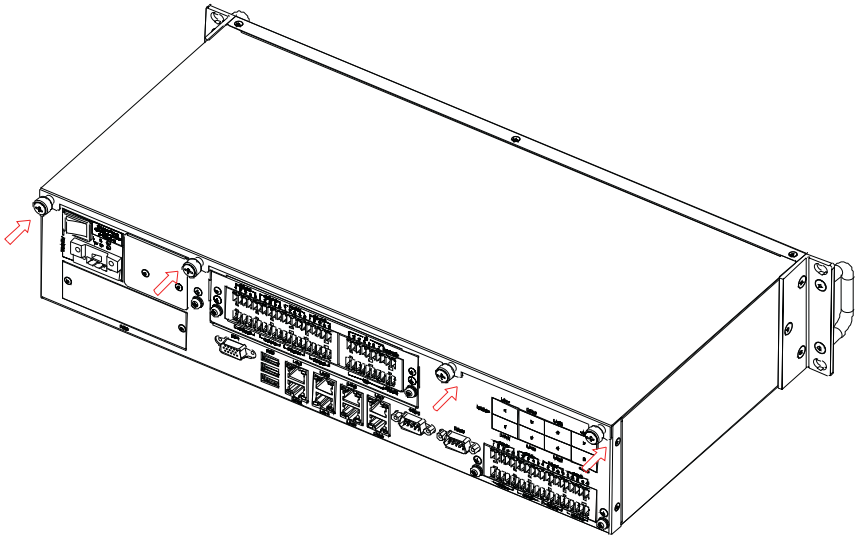


Figure 3.2 ECU-4674-A53SAE screw location

4. Remove the chassis's upper-cover:

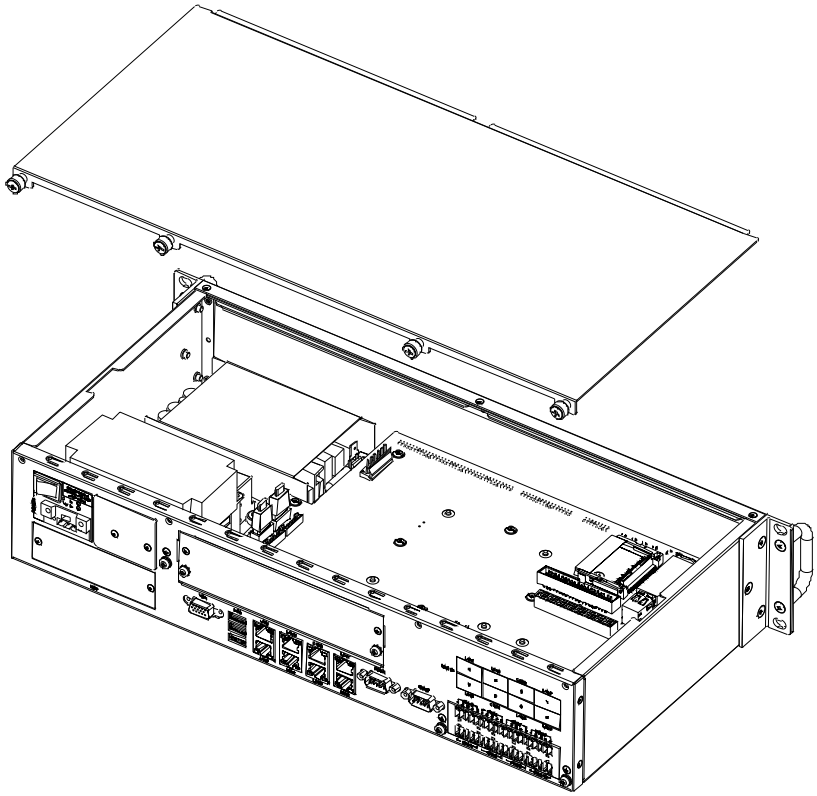


Figure 3.3 ECU-4674-LA53SAE remove upper-cover

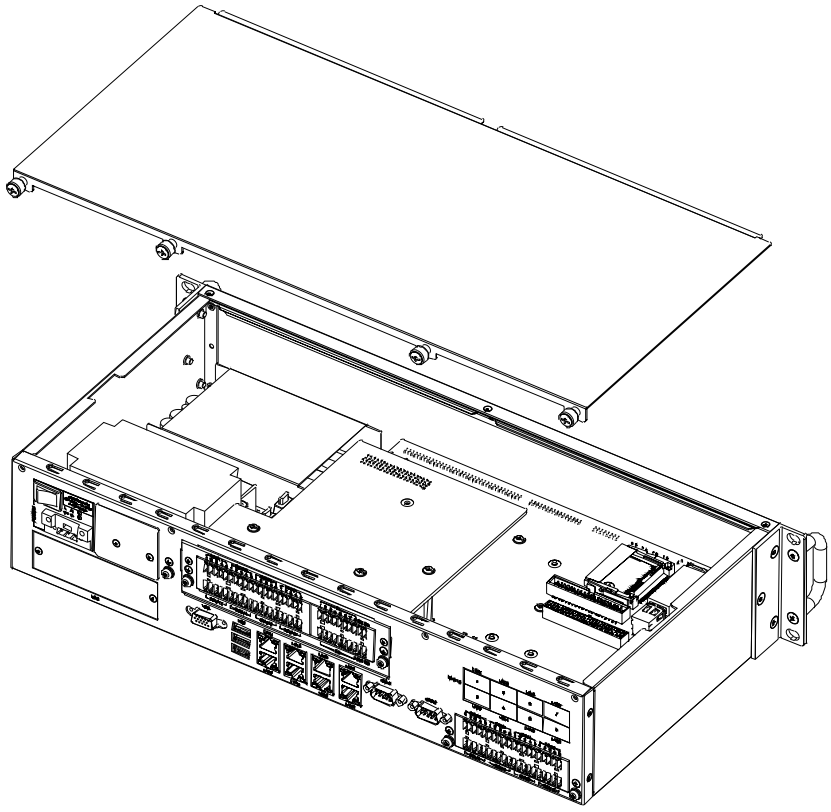


Figure 3.4 ECU-4674-A53SAE remove upper-cover

5. Open the chassis up-cover, User could set COM port terminal resistor by jumper according to the actual demand. More detail informatiion user could refer to chapter 2.5.

3.2 Install a CompactFlash Card

ECU-4674 SERIES provides one CompactFlash Card slots, to install the cards:

1. Follow section 3.1 to open the chassis.
2. Insert the card at the location (CN3) shown below.

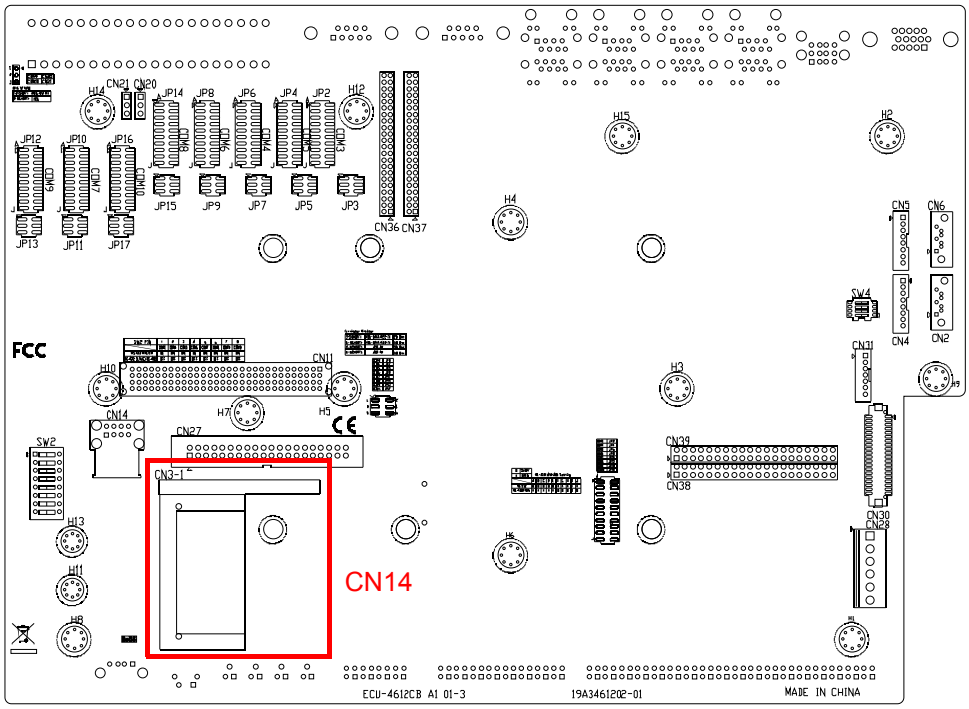


Figure 3.5 CompactFlash Card Slot Location (CN3)

3.3 Installing a USB Dongle

ECU-4674 SERIES provides a clamp the USB dongle which can be installed inside the chassis. Follow the following steps to install the USB dongle and clamp:

1. Follow section 3.1 to open the chassis.
2. Plug the USB Dongle in the upper port of CN14, note the downside of the port is a dummy port

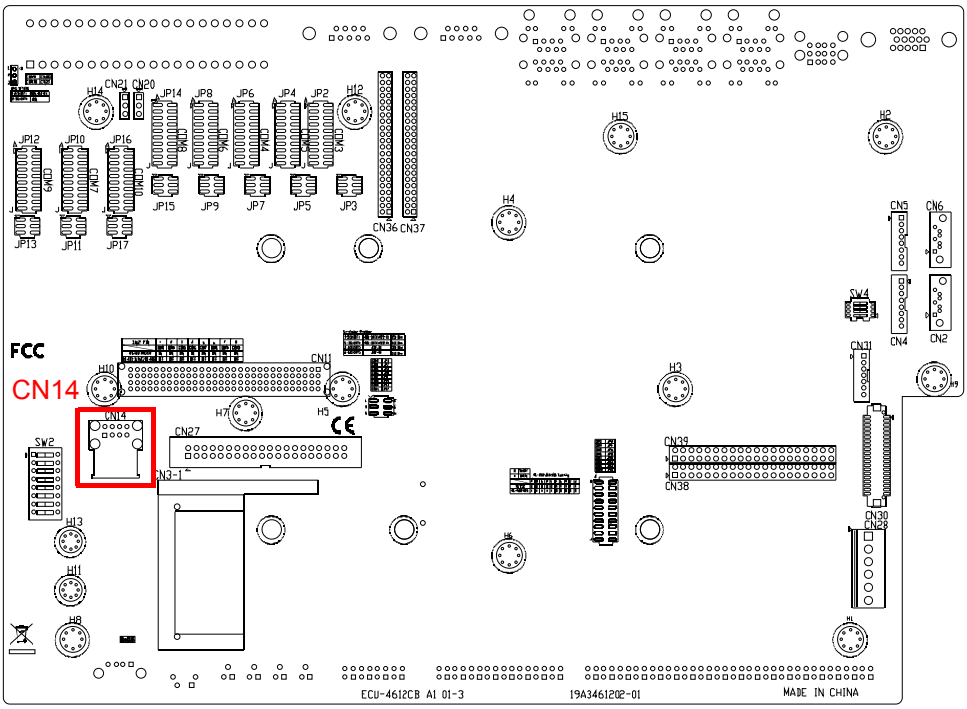
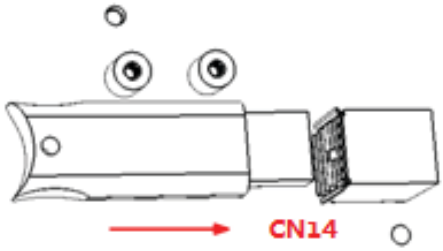
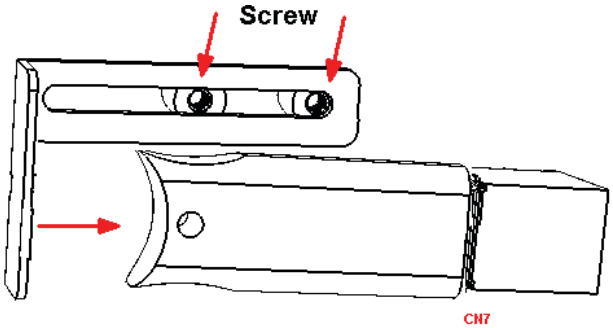


Figure 3.6 CN14 Location of Internal USB Port



3. Adjust the position of the kit to fasten the USB dongle, and then screw to fix the kit.



3.4 Installing a Hard Disk

Follow the steps below to install a HDD:

1. To install a HDD on the included HDD bracket (found in the accessory box)

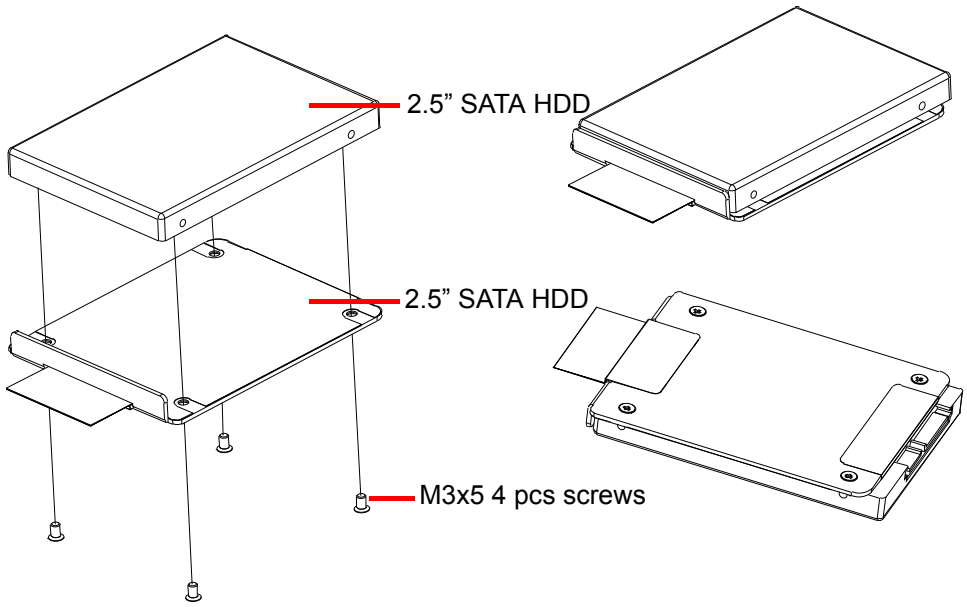


Figure 3.7 Fixing SATA HDD

2. Unscrew the two screws and remove the HDD blanking plate.

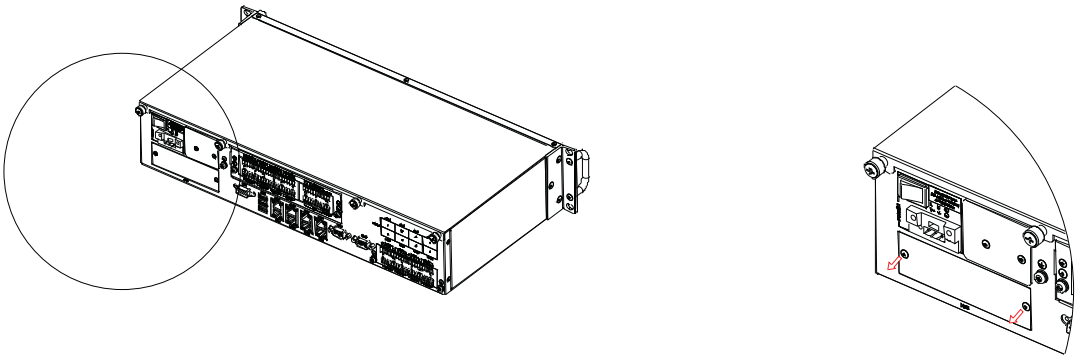


Figure 3.8 HDD back plate location

3. According to the drawing below, the HDD is directly installed on the device through the DIN-Rails (ECU-4674 Series product supports up to 2xHDD).

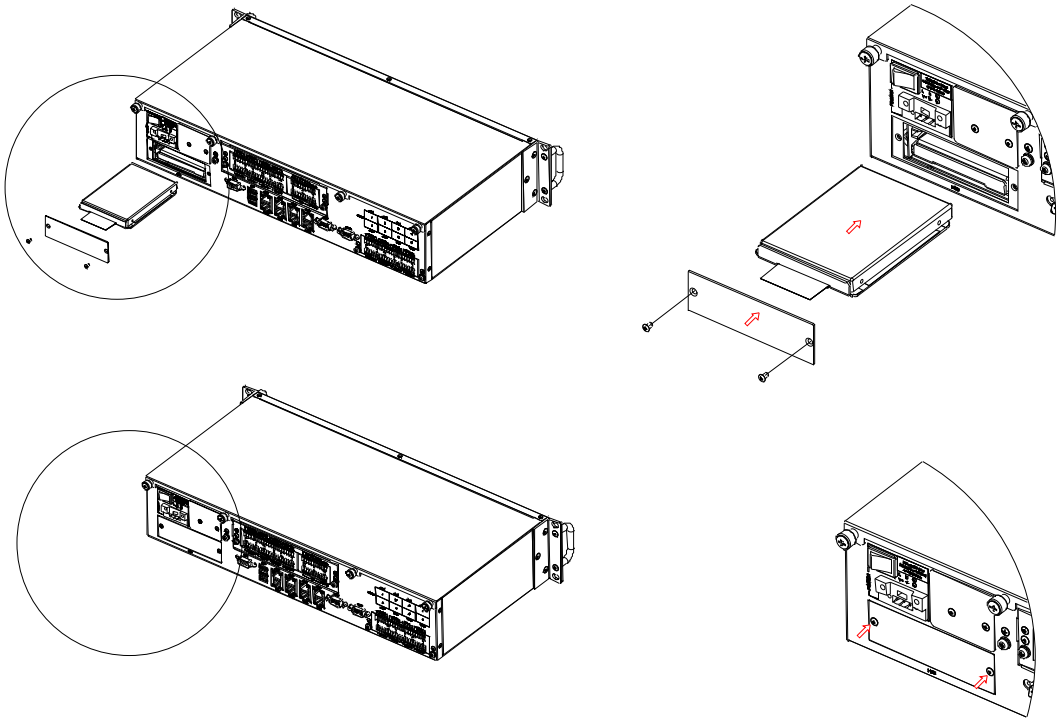


Figure 3.9 SATA HDD Installation

4. ECU-4674 series products contains SATA signal and power cable for two SATA HDD in the chassis. The locations of the connectors are shown below, SATA signal connector locates on CN4/6 and SATA power connector locates on CN2/5.

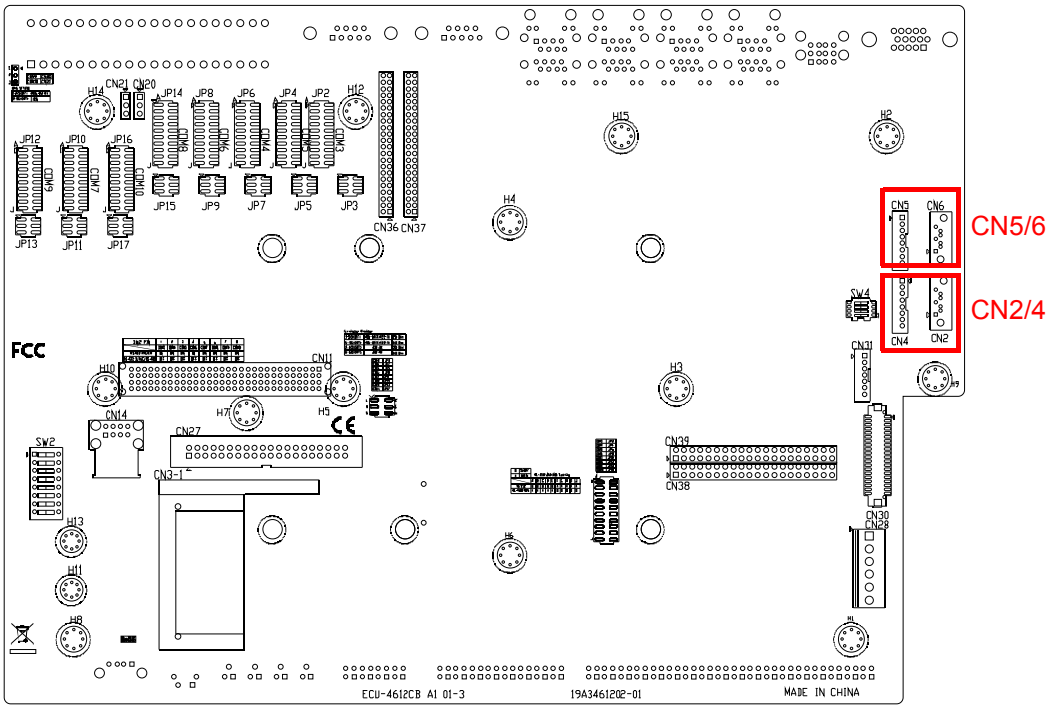


Figure 3.10 2xSATA Signal and Power Connector Location(CN2/4 CN5/6)

3.5 Installation on Rack

The ECU-4674 Series provides the kits for Rack mounting in the chassis.

1. Use the four screw holes to mount the ECU-4674 SERIES on the rack.

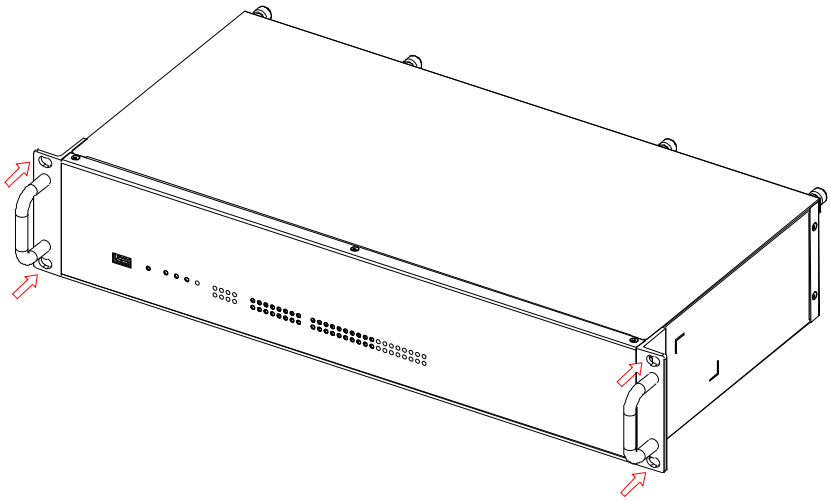


Figure 3.11 ECU-4674 Series product installation rack mounting kit

2. The ECU-4674 Series comes with Aluminum Fins on the top of the unit as heat-sink. It can generate nature convection for better heat transmission.To have optimal thermal performance, please leave 2U (440 mm) space height on the bottom of the unit.

3.6 BIOS Setup and System Assignments

ECU-4674 SERIES adopts Advantech's SOM-6765 CPU module. Further information about the SOM module, can be found in SOM's user's manual. You can find this manual on the ECU-4674 SERIES's companion DISC.

Please note that you can try to “LOAD BIOS DEFAULTS” from the BIOS Setup if the ECU-4674 SERIES does not work properly.

AMIBIOS has been integrated into many motherboards for over a decade. With the AMIBIOS Setup program, users can modify BIOS settings and control the various system features. This chapter describes the basic navigation of the SOM-6765 BIOS setup screens.

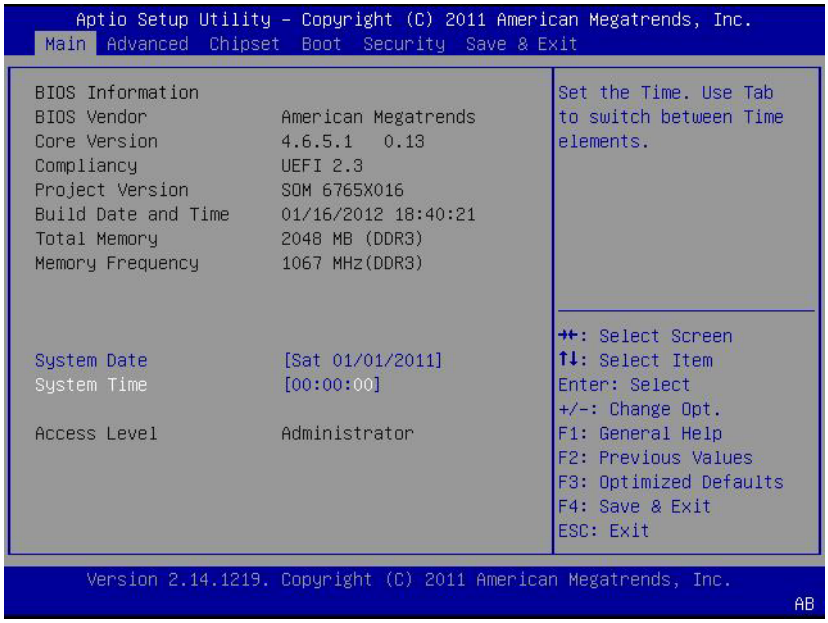

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
BIOS Information
BIOS Vendor American Megatrends
Core Version 4.6.5.1 0.13
Compliancy UEFI 2.3
Project Version SOM 6765X016
Build Date and Time 01/16/2012 18:40:21
Total Memory 2048 MB (DDR3)
Memory Frequency 1067 MHz(DDR3)
System Date [Sat 01/01/2011]
System Time [00:00:00]
Access Level Administrator
Set the Time. Use Tab to switch between Time elements.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.12 Setup program initial screen

AMI's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This information is stored in flash ROM so it retains the Setup information when the power is turned off.

3.6.1 Entering Setup

Turn on the computer and then press <F2> or <DEL> to enter Setup menu.

3.6.2 Main Setup

When users first enter the BIOS Setup Utility, users will enter the Main setup screen. Users can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

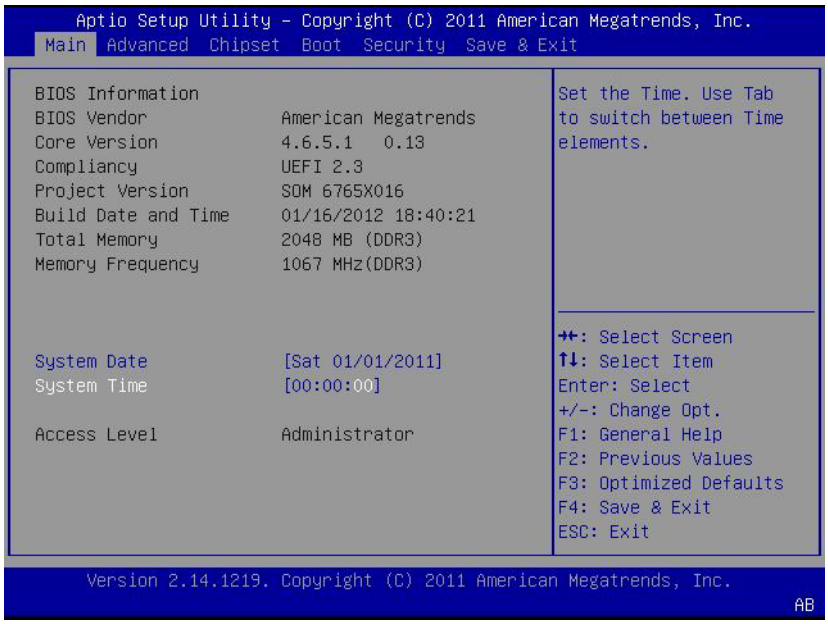

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
BIOS Information
BIOS Vendor American Megatrends
Core Version 4.6.5.1 0.13
Compliancy UEFI 2.3
Project Version SOM 6765X016
Build Date and Time 01/16/2012 18:40:21
Total Memory 2048 MB (DDR3)
Memory Frequency 1067 MHz(DDR3)
System Date [Sat 01/01/2011]
System Time [00:00:00]
Access Level Administrator
Set the Time. Use Tab to switch between Time elements.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.13 Main setup screen

The Main BIOS setup screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured; options in blue can. The right frame displays the key legend.

Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

- **System time / System date**

  Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time must be entered in HH:MM:SS format.

3.6.3 Advanced BIOS Features Setup

Select the Advanced tab from the SOM-6765 setup screen to enter the Advanced BIOS Setup screen. Users can select any item in the left frame of the screen, such as CPU Configuration, to go to the sub menu for that item. Users can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screens are shown below. The sub menus are described on the following pages.

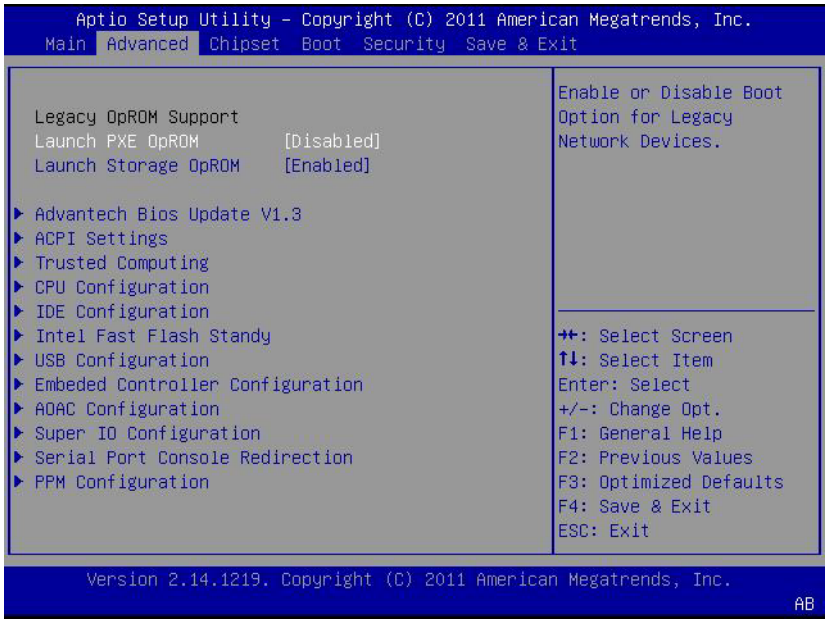


Figure 3.14 Advanced BIOS features setup screen

- **Launch PXE OpROM (Not support)**
  This item allows users to enable or disable launch PXE OpROM if available.
- **Launch Storage OpROM**
  This item allows users to enable or disable launch storage OpROM if available.

3.6.3.1 Advantech Bios Update V61.3

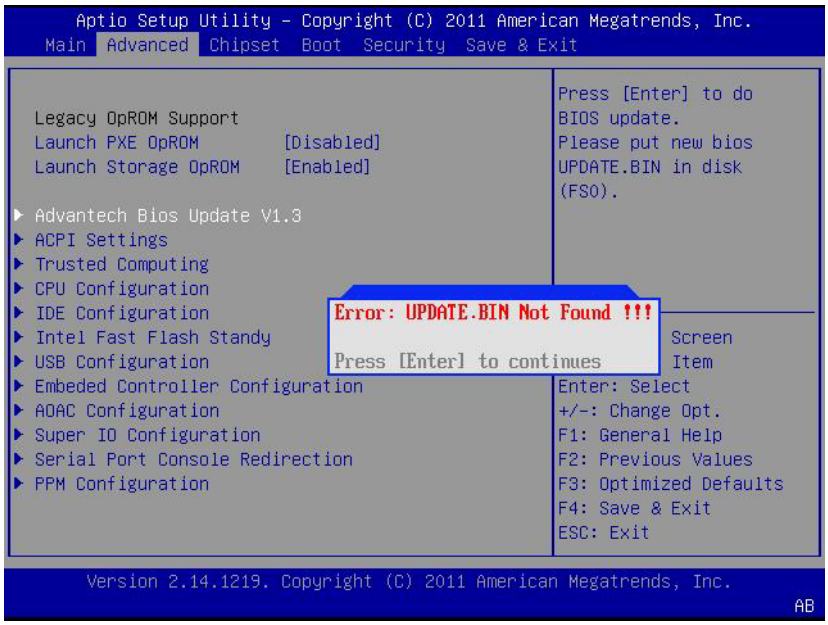


Figure 3.15 Advantech Bios Update V1.3

- **Advantech Bios Update V1.3**
  Press [Enter] to do BIOS update.
  Put new bios UPDATE.BIN in disk(FS0)

3.6.3.2 ACPI Settings

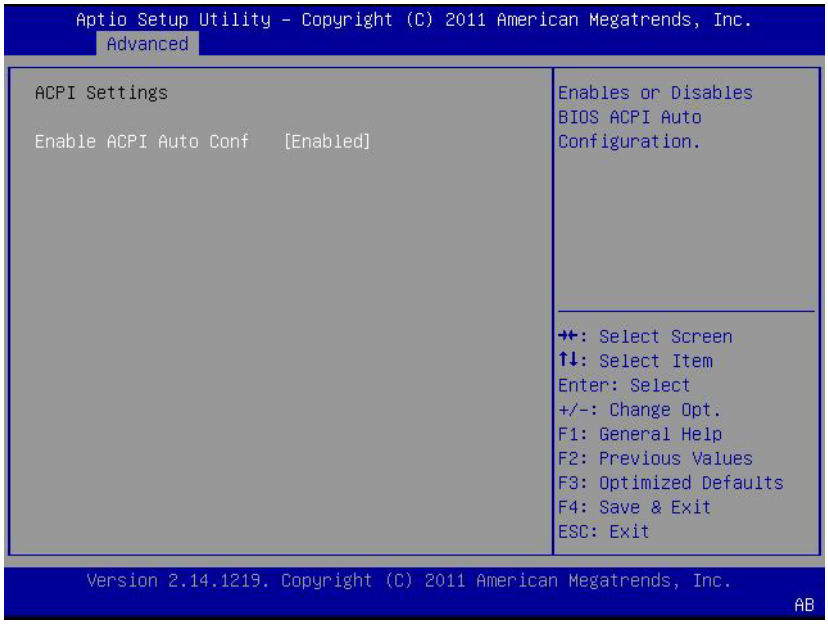


Figure 3.16 ACPI Setting

- **Enable ACPI Auto Configuration**
  This item allows users to enable or disable BIOS ACPI auto configuration.
- **Enable Hibernation**
  This item allows users to enable or disable hibernation.

- **ACPI Sleep State**
  This item allows users to set the ACPI sleep state.
- **Lock Legacy Resources**
  This item allows users to lock legacy devices resources.
- **S3 Video Repost**
  Enable or Disable S3 Video Repost.

3.6.3.3 TPM Configuration

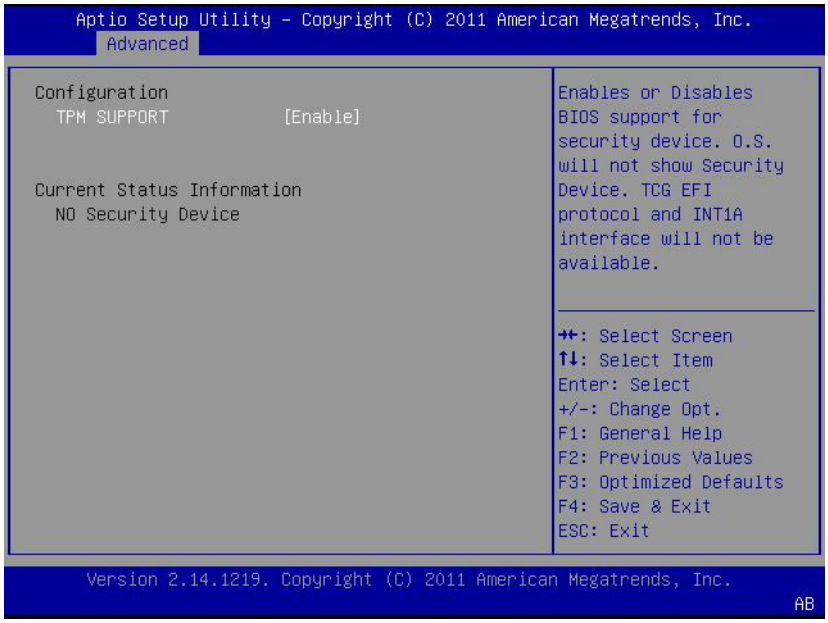

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Configuration
TPM SUPPORT [Enable]
Current Status Information
NO Security Device
Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.17 TPM Configuration

- **TPM Support (Not supported)**
  Disable/Enable TPM if available.

3.6.3.4 CPU Configuration

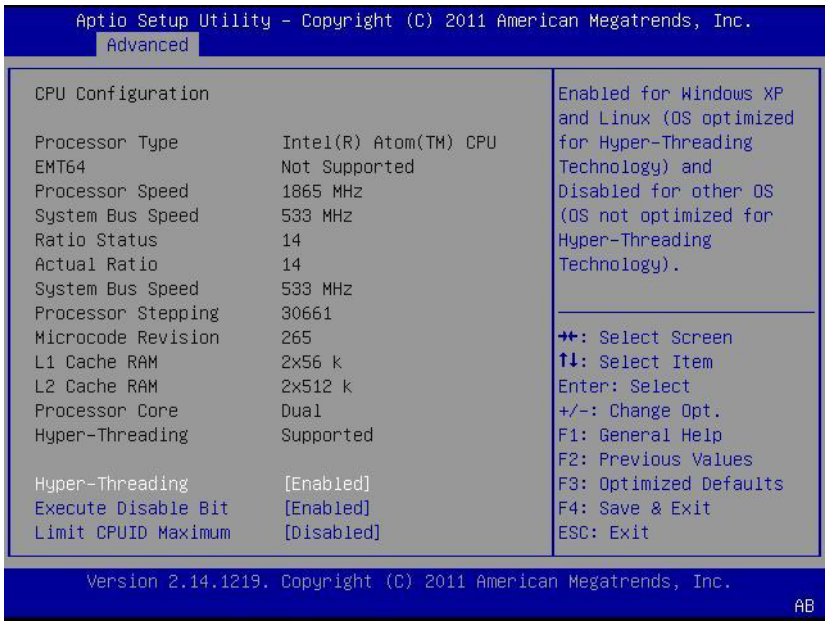

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
CPU Configuration
Processor Type Intel(R) Atom(TM) CPU
EMT64 Not Supported
Processor Speed 1865 MHz
System Bus Speed 533 MHz
Ratio Status 14
Actual Ratio 14
System Bus Speed 533 MHz
Processor Stepping 30661
Microcode Revision 265
L1 Cache RAM 2x56 k
L2 Cache RAM 2x512 k
Processor Core Dual
Hyper-Threading Supported
Hyper-Threading [Enabled]
Execute Disable Bit [Enabled]
Limit CPUID Maximum [Disabled]
Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.18 Super I/O Configuration

- **Hyper Threading Technology**
  This item allows users to enable or disable Intel Hyper Threading technology.
- **Limit CPUID Maximum**
  This item allows users to limit the maximum value of CPUID.
- **Execute Disable Bit**
  This item allows users to enable or disable the No-Execution page Protection technology.

3.6.3.5 SATA Configuration

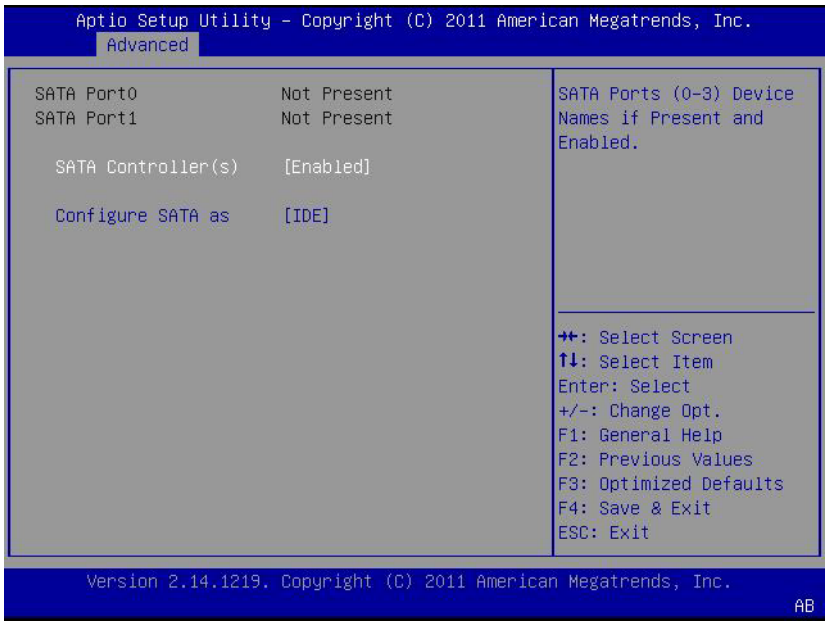


Figure 3.19 SATA Configuration

- **SATA Controller(s)**
  This item allows users to enable or disable the SATA controller(s).
- **SATA Mode Selection**
  This item allows users to select mode of SATA controller(s).

3.6.3.6 Intel Fast Flash

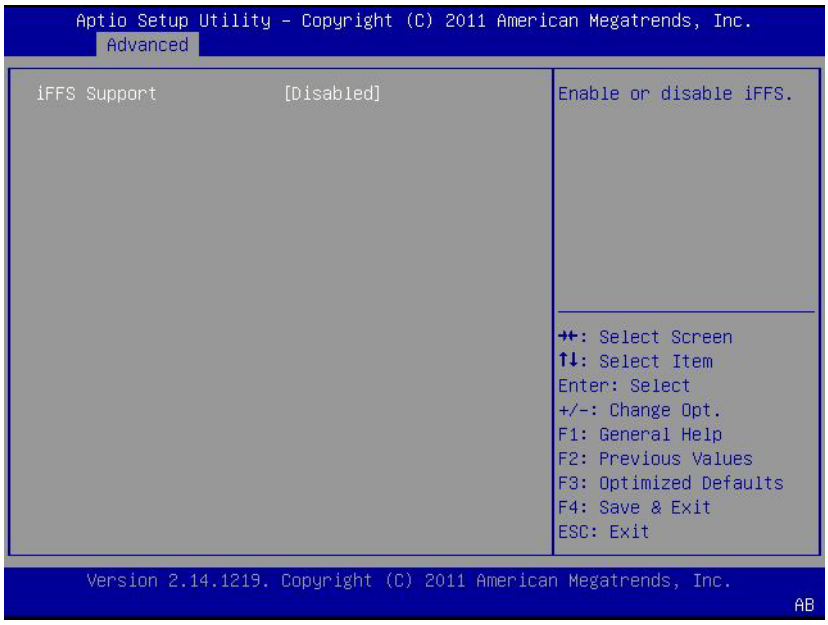


Figure 3.20 Intel Fast Flash

- **iFFS Support**
  Enable or disable IFFS function.

3.6.3.7 USB Configuration

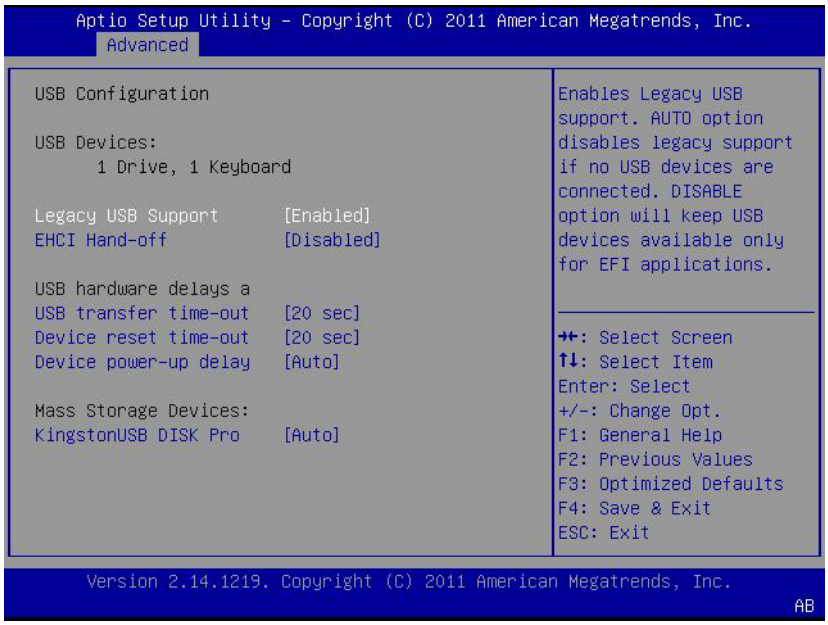

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
1 Drive, 1 Keyboard
Legacy USB Support [Enabled]
EHCI Hand-off [Disabled]
USB hardware delays a
USB transfer time-out [20 sec]
Device reset time-out [20 sec]
Device power-up delay [Auto]
Mass Storage Devices:
KingstonUSB DISK Pro [Auto]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.21 USB Configuration

- **Legacy USB Support**
  Enable the support for legacy USB. Auto option disables legacy support if no USB devices are connected.
- **EHCI Hand-Off**
  This is a workaround for the OS without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
- **USB transfer time-out**
  Set the time-out value for Control, Bulk, and Interrupt transfers.
- **Device reset time-out**
  Set USB mass storage device Start Unit command time-out value.
- **Device power-up delay**
  Set the maximum time of the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.

3.6.3.8 Embedded Controller Configuration

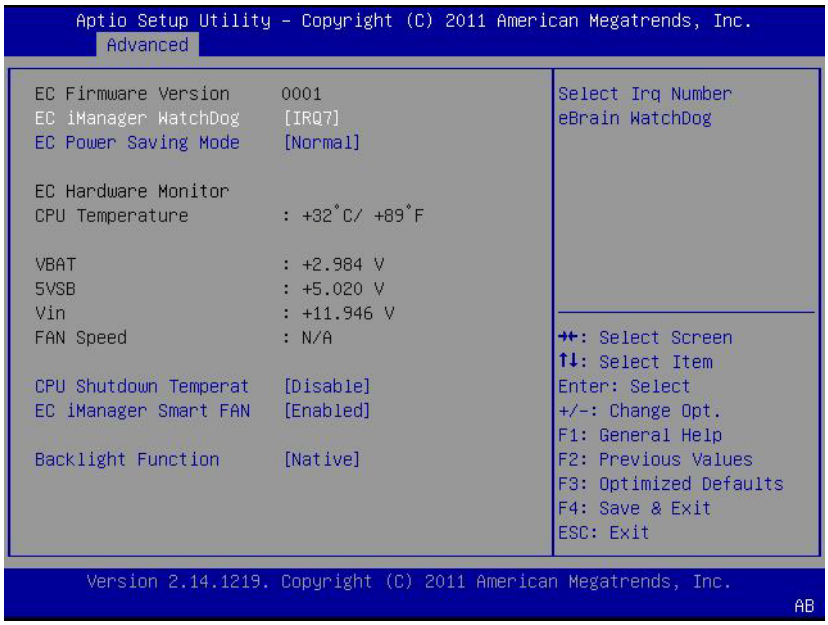


Figure 3.22 Embedded Controller Configuration

- **EC iManager WatchDog IRQ**
  This item allows users to set the irq number of EC watchdog.
- **EC Power Saving Mode**
  This item allows users to set boards power saving mode when off.
- **CPU Shutdown Temperature**
  This item allows users to set the value of CPU shutdown temperature.
- **EC iManager Smart FAN**
  This item allows users to enable or disable smart FAN feature.
- **Backlight Function**
  This item allows users to set backlight enable polarity.

3.6.3.9 AOAC Configuration

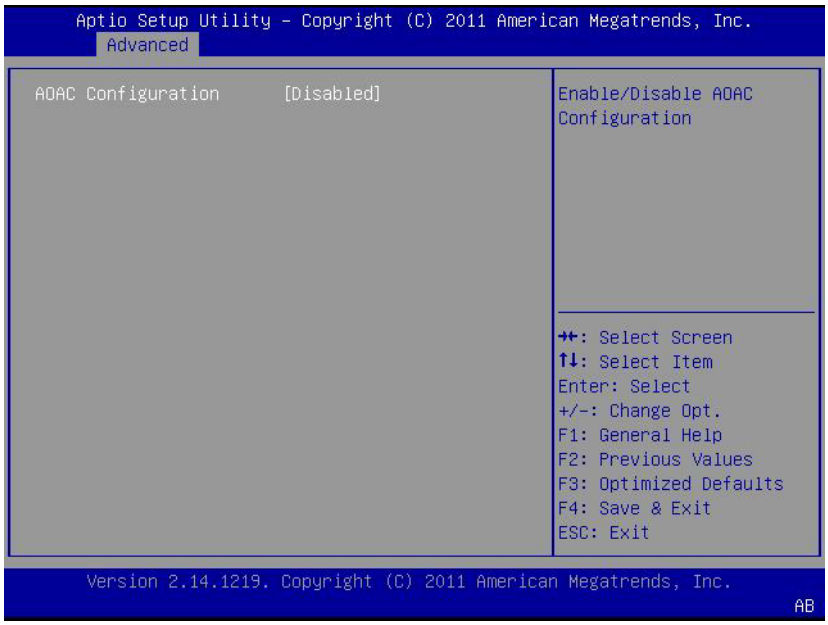


Figure 3.23 AOAC Configuration

- **AOAC Configuration**
  Enable/Disable AOAC Configuration.

3.6.3.10 Super IO Configuration

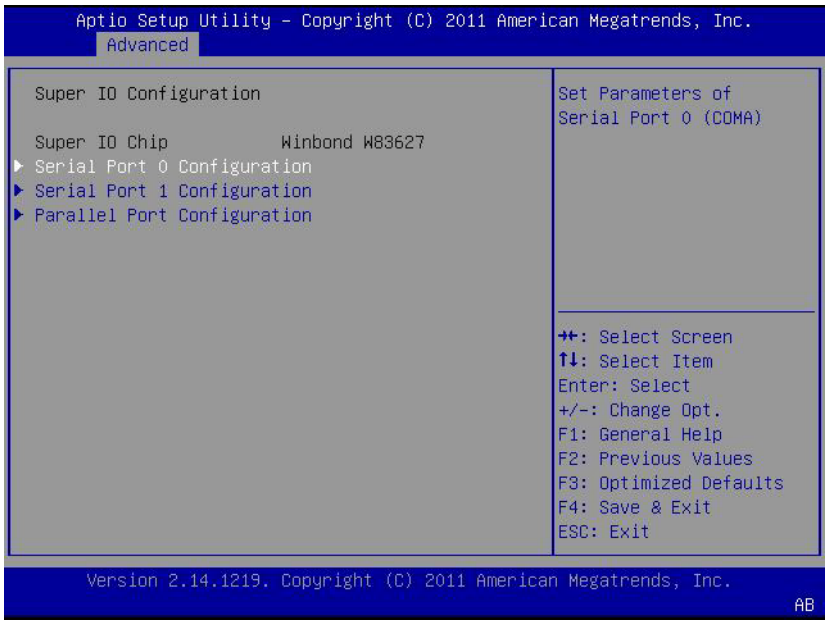


Figure 3.24 Super IO Configuration

- **Serial Port 0 Configuration**
  This item allows users to configure serial port 0.
- **Serial Port 1 Configuration**
  This item allows users to configure serial port 1.
- **Parallel Port Configuration**
  This item allows users to configure parallel port.

3.6.3.11 Serial Port Console Redirection

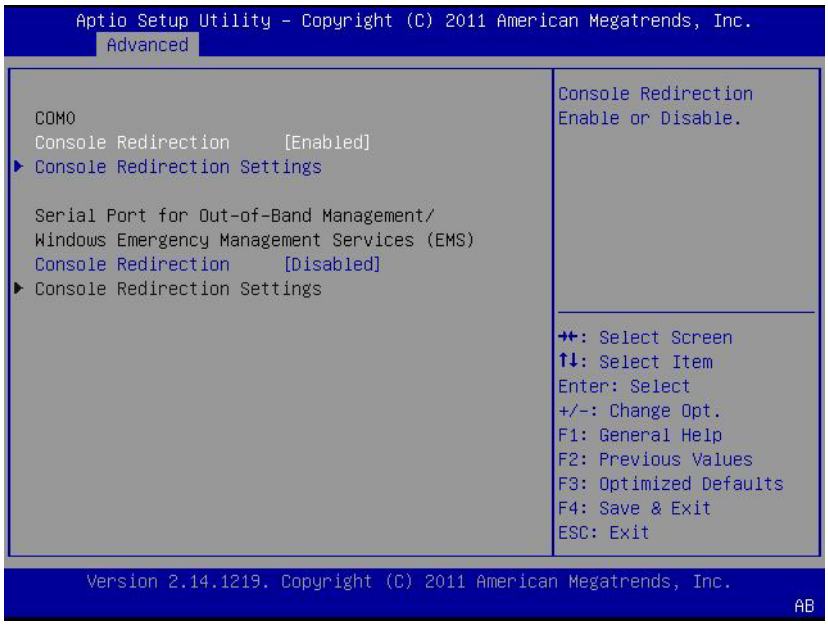


Figure 3.25 Serial Port Console Redirection

- **Console Redirection(COM0)**
  Console Redirection Enable or Disable.
- **Console Redirection Settings**
  The settings specify how the host computer and the computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.
- **Console Redirection (EMS)**
  Console Redirection Enable or Disable.
- **Console Redirection Settings**
  This item allows users to enable or disable console redirection for Microsoft Windows Emergency Management Services (EMS).

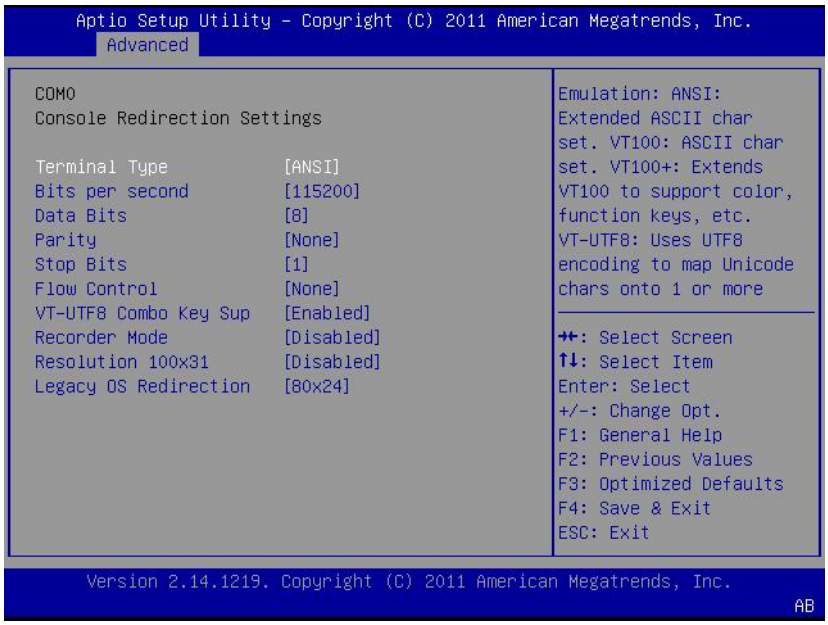


Figure 3.26 Console Redirection Settings

- **Terminal Type**

  Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

- **Bits per second**

  Select the serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

- **Data Bits**

  Data Bits 7 or 8

- **Parity**

  A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

- **Stop Bits**

  Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

- **Flow Control**

  Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

- **VT-UTF8 Combo Key Support**

  Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals

- **Recorder Mode**

  With this mode enabled only text will be sent. This is to capture Terminal data.

- **Resolution 100x31**

  Enables or disables extended terminal resolution

- **Legacy OS Redirection**

  On Legacy OS, the Number of Rows and Columns supported redirection

Redirection Settings

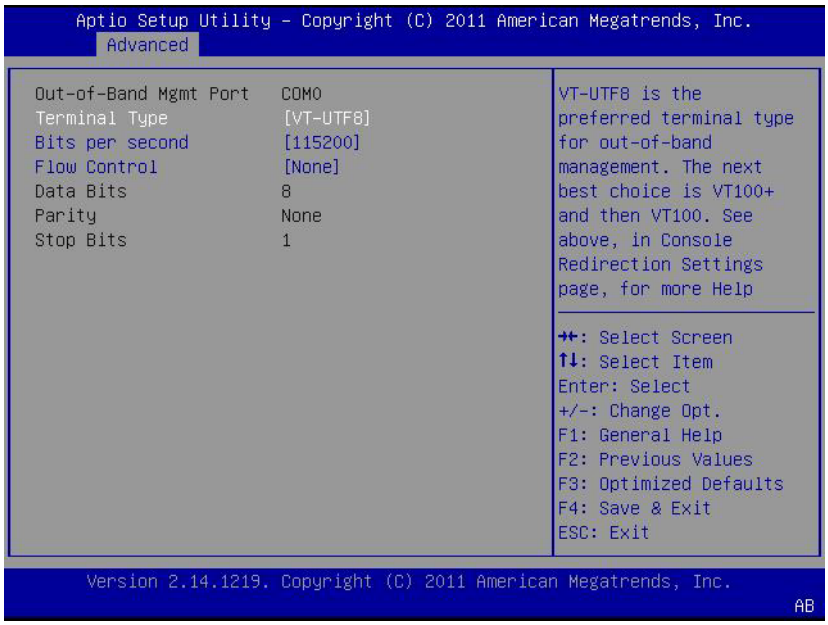

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Advanced
Out-of-Band Mgmt Port COM0
Terminal Type [VT-UTF8]
Bits per second [115200]
Flow Control [None]
Data Bits 8
Parity None
Stop Bits 1
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.27 Console Redirection Settings

– **Terminal Type**

VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in Console Redirection Settings page, for more Help with Terminal Type/Emulation.

– **Bits per second**

Select the serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speeds.

– **Flow Control**

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop signals.

3.6.3.12 PPM Configuration

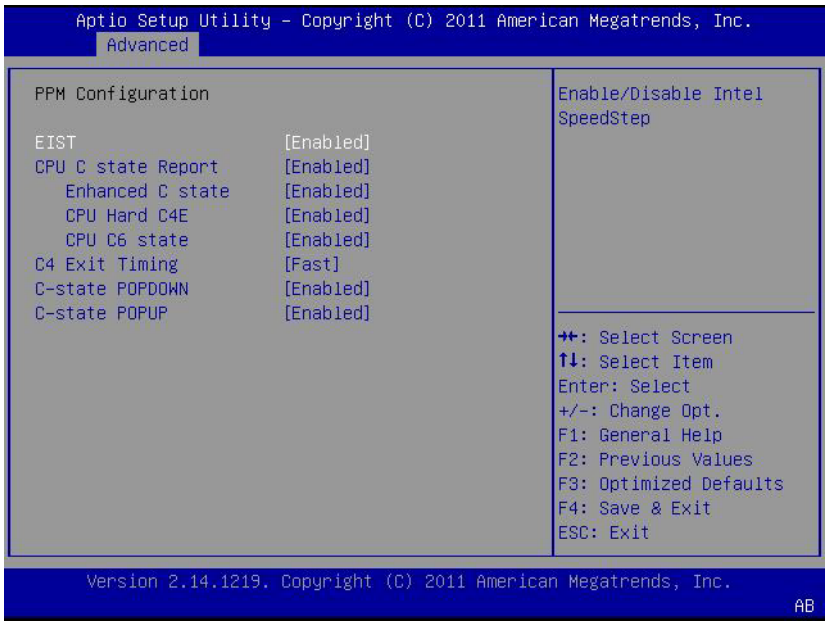


Figure 3.28 PPM Configuration

- **EIST**

  CPU runs at its default speed if disabled; CPU speed is controlled by the operating system if enabled.

- **CPU C3/C6/C7 Report**

  This item allows users to enable or disable CPU C-state support.

3.6.4 Chipset

Select the Chipset tab from the SOM-6765 setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.

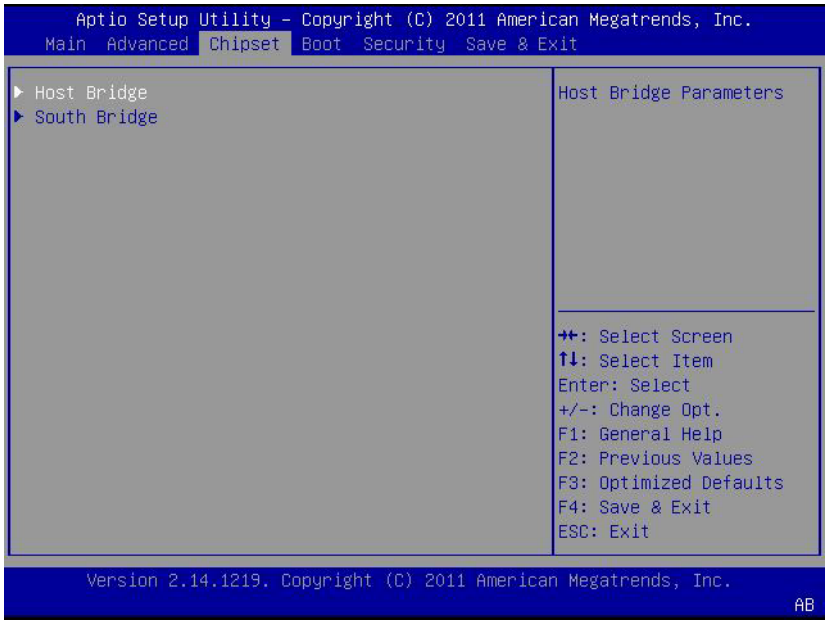


Figure 3.29 Chipset Setup

3.6.4.1 Intel IGD Configuration

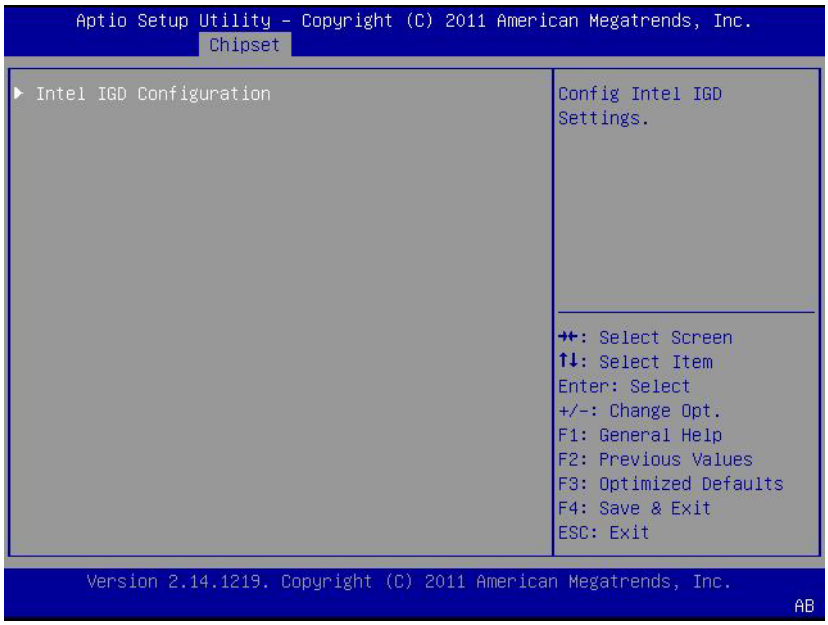


Figure 3.30 Intel IGD Configuration

- **Intel IGD Configuration**
  Configure Intel IGD Settings.

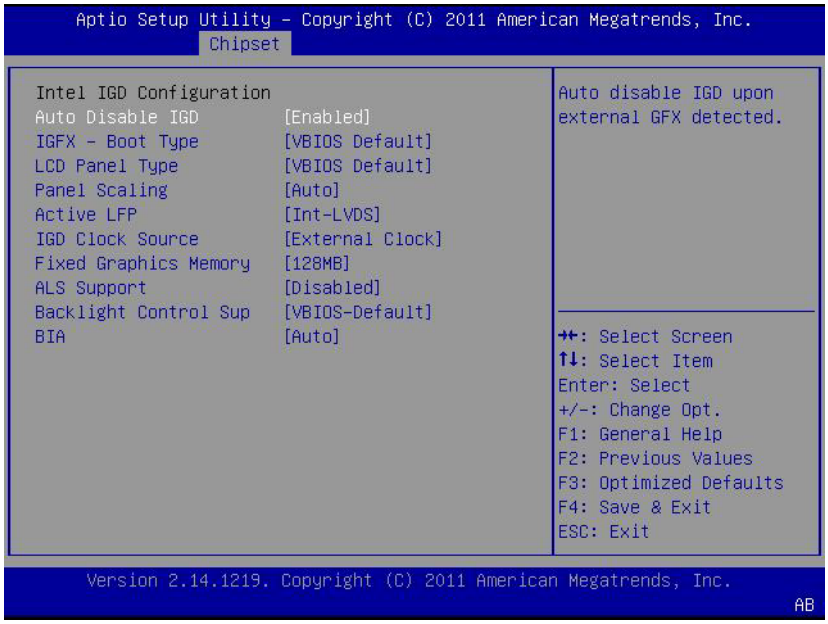


Figure 3.31 Intel IGD Configuration

- **Auto Disable IGD**
  Auto disable IGD upon external GFX detected.
- **IGFX - Boot Type**
  Select the Video Device which will be activated during POST. This has no effect if external graphics present.
- **LCD Panel Type**
  Select LCD panel used by Internal Graphics Device by selecting the appropriate setup item.

– **Panel Scaling**
  Select the LCD panel scaling option used by the Internal Graphics Device.
– **LFP**
  Select the Active LFP Configuration.
  No LVDS: VBIOS does not enable LVDS.
  Int-LVDS: VBIOS enables LVDS driver by Integrated encoder.
– **IGD Clock Source**
  IGD Clock Source selection External/Internal Clock.
– **Fixed Graphics Memory Size**
  Configure Fixed Graphics Memory Size
– **ALS Support**
  Valid only for ACPI.
  Legacy = ALS Support through the IGD INT10 function.
  ACPI = ALS support through an ACPI ALS driver.
– **Backlight Control Support**
  Backlight Control Configuration
– **BIA**
  Auto: GMCH Use VBT Default;
  Level n: Enabled with Selected Aggressiveness Level

South Bridge

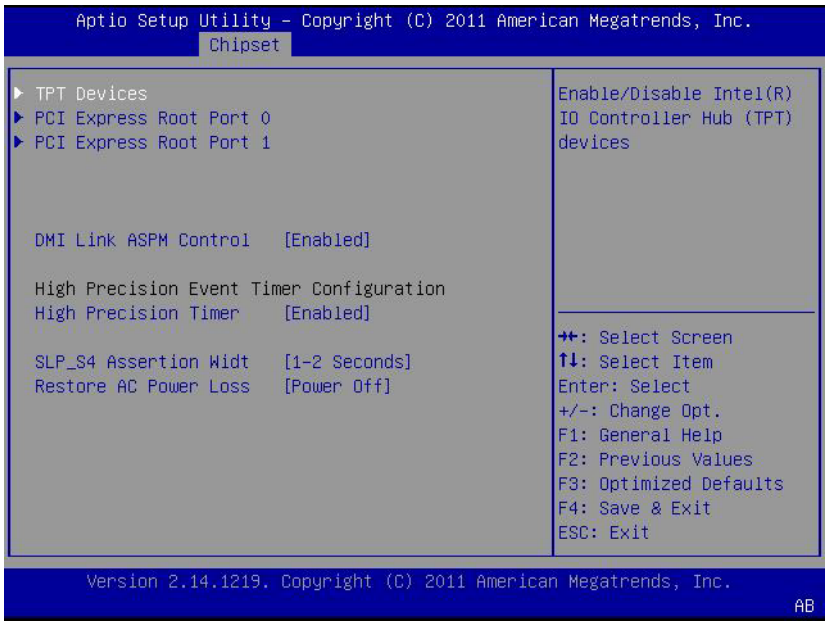

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Chipset
TPT Devices
PCI Express Root Port 0
PCI Express Root Port 1
DMI Link ASPM Control [Enabled]
High Precision Event Timer Configuration
High Precision Timer [Enabled]
SLP_S4 Assertion Widt [1-2 Seconds]
Restore AC Power Loss [Power Off]
Enable/Disable Intel(R) IO Controller Hub (TPT) devices
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.32 South Bridge

– **TPT Devices**
  Enable/Disable Intel(R) IO Controller Hub (TPT) devices.
– **PCI Express Root Port 0**
  PCI Express Root Port 0 Settings.
– **PCI Express Root Port 1**
  PCI Express Root Port 1 Settings.

– **DMI Link ASPM Control**
The control of Active State Power Management on both NB side and SB side of the DMI Link.
– **High Precision Timer**
Enable or Disable the High Precision Event Timer.
– **SLP_S4 Assertion Width**
Select a minimum assertion width of the SLP_S4# signal
– **Restore AC Power Loss**
Select AC power state when power is re-applied after a power failure.

■ TPT Devices

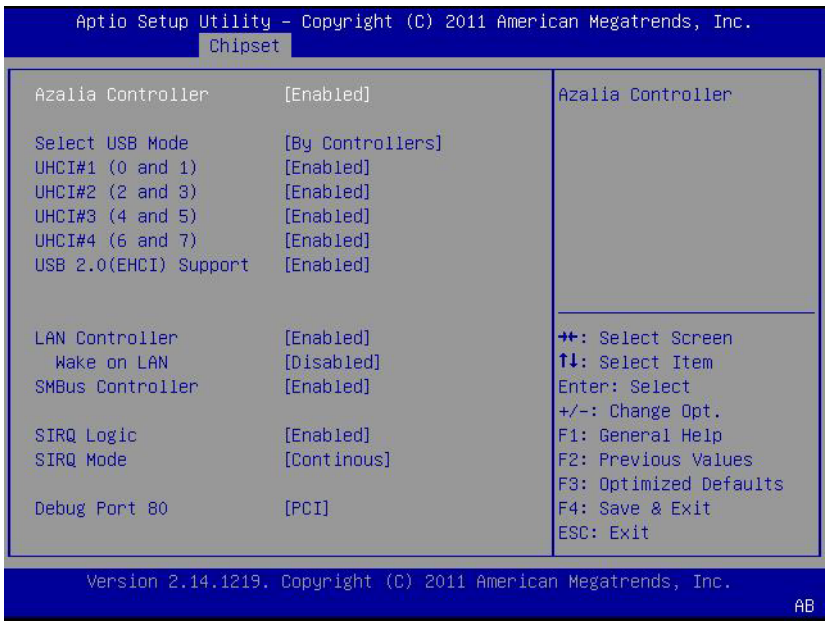


Figure 3.33 TPT Devices

– **Azalia Controller**
Azalia Controller Enable/Disable
– **Select USB Mode**
Select USB mode to control USB ports.
UHCI#1 (0 and 1) / UHCI#2 (2 and 3) / UHCI#3 (4 and 5) / UHCI#4 (6 and 7)
Control the USB UHCI (USB 1.1) functions.\n\nDisable from highest to lowest controller.
– **USB 2.0(EHCI) Support**
Enable or Disable USB 2.0 (EHCI) Support.
– **LAN Controller**
Enable or Disable OnChip NIC Controller.
– **Wake on LAN**
Enable or disable PCIE LAN to wake the system.
– **SMBus Controller**
Enable or Disable OnChip SMBus Controller.
– **SIRQ Logic**
Enable or Disable SIRQ logic.

– **SIRQ Mode**
  Set SIRQ mode.
– **Debug Port 80**
  Show Debug Port 80 from PCI or LPC

– **PCI Express Root Port 0**

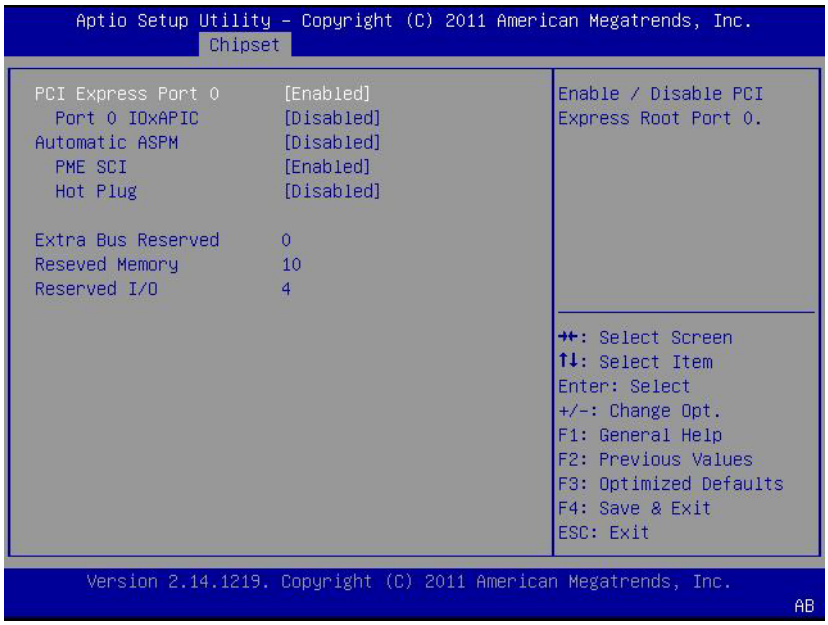


Figure 3.31 PCI Express Root Port 0

PCI Express Port 0

Enable / Disable PCI Express Root Port 0.

Port 0 IOxAPIC

Enable / Disable PCI Express Root Port 0 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues.

PME SCI

PCI Express PME SCI Enable/Disable.

Hot Plug

PCI Express Hot Plug Enable/Disable.

Extra Bus Reserved

Extra Bus Reserved (0-7) for bridges behind this Root Bridge.

Reseved Memory

Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge.

Reserved I/O

Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

– **PCI Express Root Port 1**

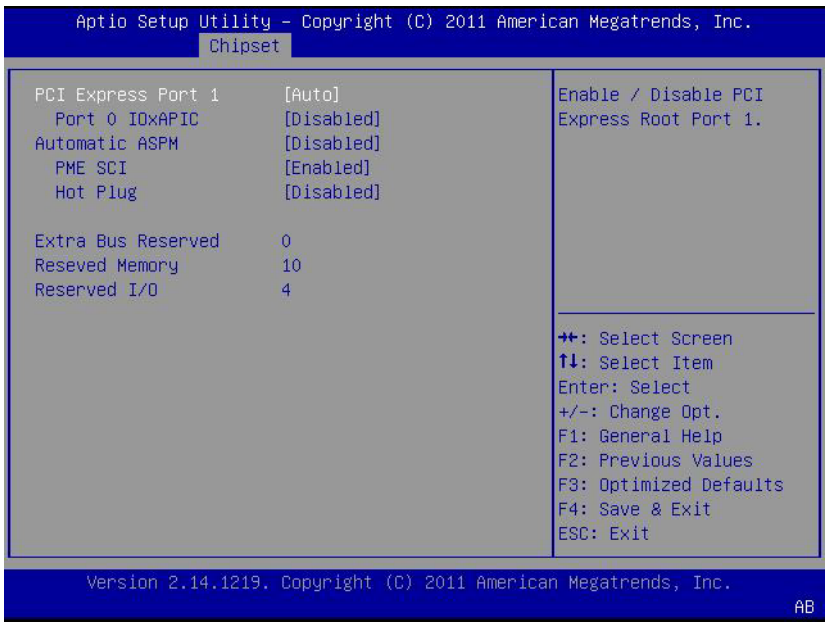


Figure 3.34 PCI Express Root Port 0

PCI Express Port 1

Enable / Disable PCI Express Root Port 1.

Port 0 IOxAPIC

Enable / Disable PCI Express Root Port 0 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues.

PME SCI

PCI Express PME SCI Enable/Disable.

Hot Plug

PCI Express Hot Plug Enable/Disable.

Extra Bus Reserved

Extra Bus Reserved (0-7) for bridges behind this Root Bridge.

Reseved Memory

Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge.

Reserved I/O

Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.

3.6.5 Boot Settings

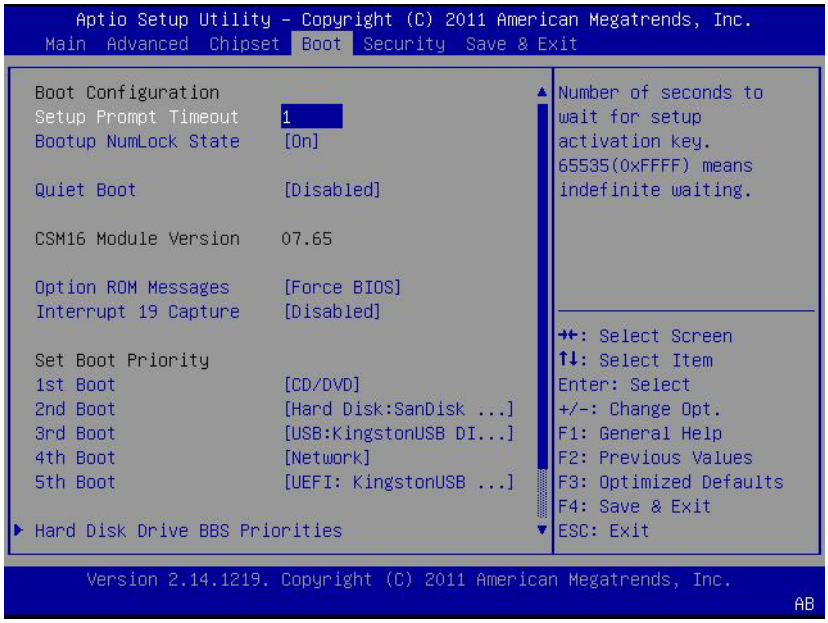

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Quiet Boot [Disabled]
CSM16 Module Version 07.65
Option ROM Messages [Force BIOS]
Interrupt 19 Capture [Disabled]
Set Boot Priority
1st Boot [CD/DVD]
2nd Boot [Hard Disk:SanDisk ...]
3rd Boot [USB:KingstonUSB DI...]
4th Boot [Network]
5th Boot [UEFI: KingstonUSB ...]
Hard Disk Drive BBS Priorities
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.35 Boot Setup Utility

- **Setup Prompt Timeout**
  This item allows users to select the number of seconds to wait for setup activation key.
- **Bootup NumLock State**
  Select the Power-on state for Numlock.
- **Quiet Boot**
  If this option is set to Disabled, the BIOS displays normal POST messages. If Enabled, an OEM Logo is shown instead of POST messages.
- **Option ROM Message**
  Set display mode for option ROM.
- **Interrupt 19 Capture**
  This item allows option ROMs to trap interrupt 19.
- **1st/2nd/3rd/4th/5th Boot**
  This item allows users to set boot device priority.

3.6.6 Security Setup

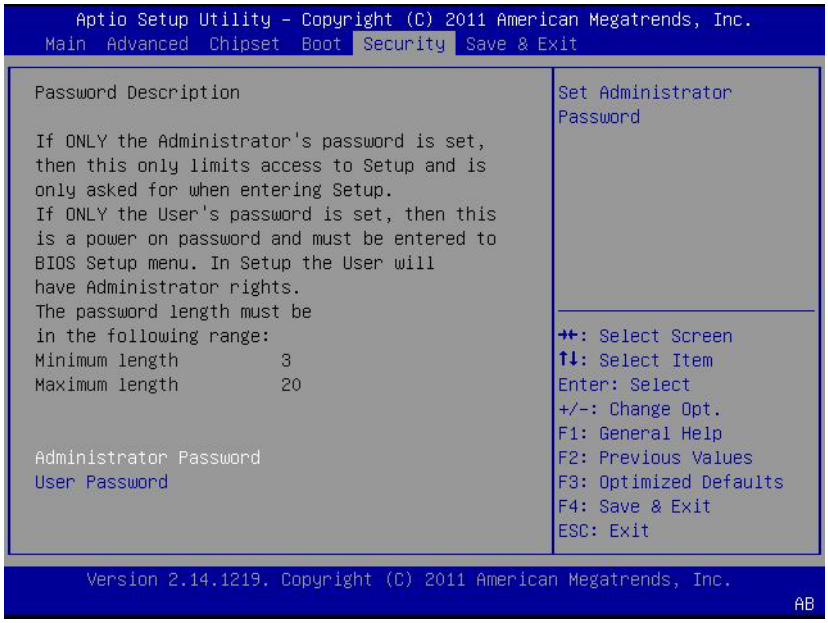

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to BIOS Setup menu. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.
AB

Figure 3.36 Security Setup

Select Security Setup from the SOM-6765 Setup main BIOS setup menu. All Security Setup options, such as password selection is described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- **Change Administrator / User Password**
  Select this option and press <ENTER> to access the sub menu, and then type in the password.

3.6.7 Save & Exit

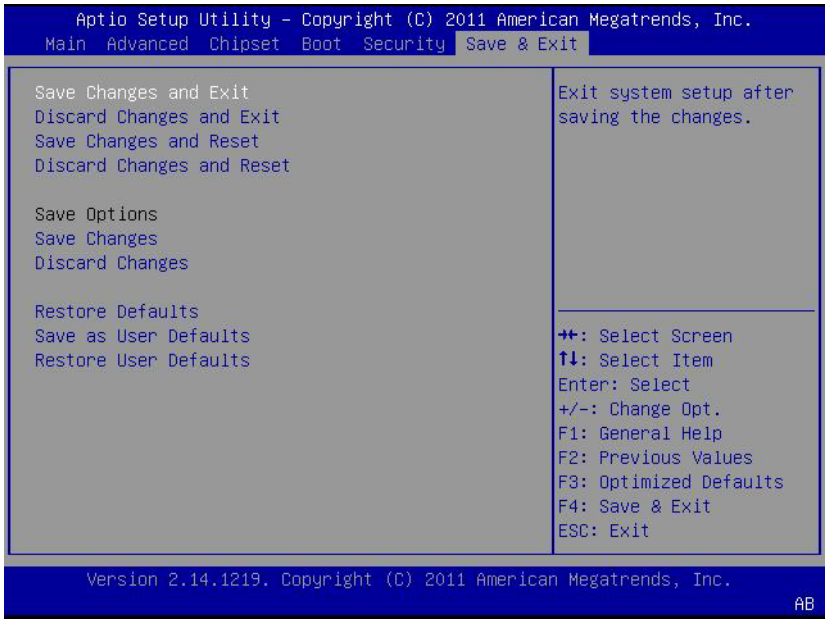


Figure 3.37 Save & Exit

- **Save Changes and Exit**

  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer if necessary to take effect all system configuration parameters.

- **Discard Changes and Exit**

  Select this option to quit Setup without making any permanent changes to the system configuration.

- **Save Changes and Reset**

  When users have completed system configuration, select this option to save changes, exit BIOS setup menu and reboot the computer to take effect all system configuration parameters.

- **Discard Changes and Reset**

  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer.

- **Save Changes**

  When users have completed system configuration, select this option to save changes without exit BIOS setup menu.

- **Discard Changes**

  Select this option to discard any current changes and load previous system configuration.

- **Restore Defaults**

  The SOM-6765 automatically configures all setup items to optimal settings when users select this option. Optimal Defaults are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Defaults if the users computer is experiencing system configuration problems.

- **Save User Defaults**

  When users have completed system configuration, select this option to save changes as user defaults without exit BIOS setup menu.

- **Restore User Defaults**
  The users can select this option to restore user defaults.

Note! *ECU-4674 Series does not support S3 (Suspend to RAM) mode.*

Appendix A

Pin Assignments

A.1 RS-232 Serial Ports (COM1~COM2)

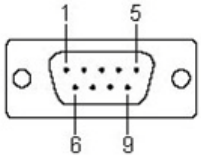


Table A.1: COM (1~2) Port Pin Definitions	
Pins	**RS-232**
1	-
2	RXD
3	TXD
4	-
5	GND
6	-
7	RTS
8	CTS
9	-

A.2 RS-232/485 Serial Ports (COM3 ~ COM18)

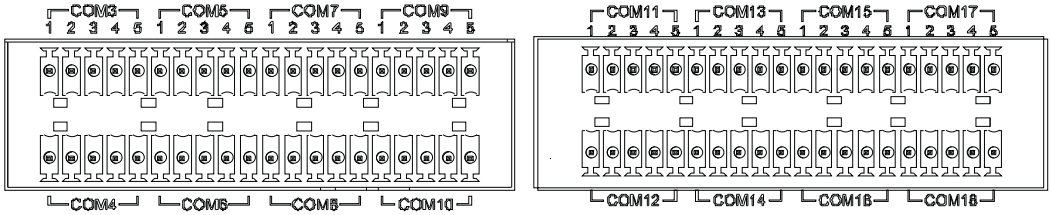


Table A.2: RS-232/485 Serial Ports (COM3 ~ 18)		
Pins	**RS-232**	**RS-485**
1	Rx	-
2	Tx	-
3	-	Data+
4	-	Data-
5	GND	

A.3 DI/O and IRIG Connectors Pin Assignments

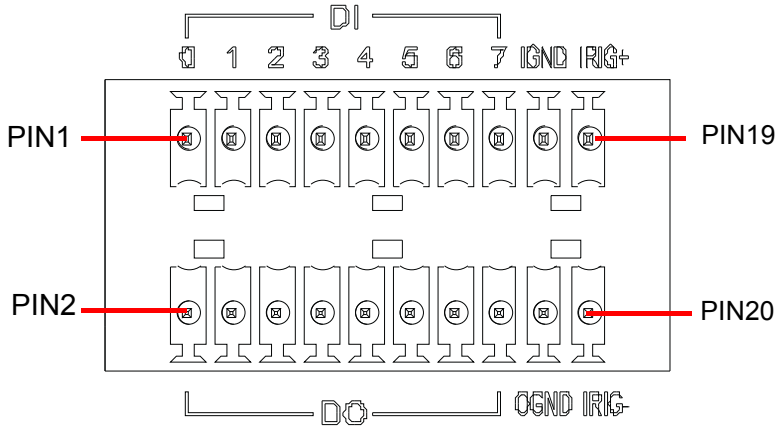


Table A.3: DI Pin Definitions

Pins	Definitions
1	DI0
3	DI1
5	DI2
7	DI3
9	DI4
11	DI5
13	DI6
15	DI7
17	IGND

Table A.4: DO Pin Definitions

Pins	Definitions
2	DO0
4	DO1
6	DO2
8	DO3
10	DO4
12	DO5
14	DO6
16	DO7
18	OGND

Table A.5: IRIG Pin Definitions

Pins	Definitions
19	IRIG+
20	IRIG-

A.4 USB Connectors (USB1 ~ USB5)

Table A.6: USB Connector Pin Assignments		
Pin	**Signal**	**Cable Color**
1	VCC	Red
2	DATA-	White
3	DATA+	Green
4	GND	Black

A.5 LAN Connectors (LAN1~LAN8)

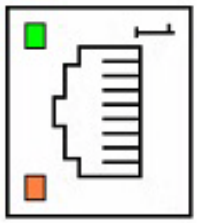


Table A.7: LAN Connector Pin Assignments		
Pin	**Assignment**	**Description**
1	TD+	Transmit +
2	TD-	Transmit -
3	RD +	Receive +
4	N/C	not used
5	N/C	not used
6	RD -	Receive -
7	N/C	not used
8	N/C	not used

A.6 VGA Display Connector

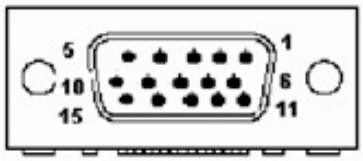


Table A.8: VGA Adaptor Cable Pin Assignments

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	N/C
5	GND
6	GND
7	GND
8	GND
9	VCC
10	GND
11	N/C
12	VGA_SDA
13	HSYNC
14	VSYNC
15	VGA_SCL

A.7 POWER Pin Assignments

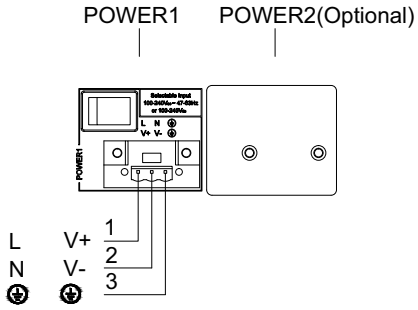


Table A.9: AC/DC Power Input PIN Definition

Pins	Screen printing	Function Description
1	L/V+	PWR1 AC/DC power input PIN
2	N/V-	PWR1 AC/DC power input PIN
3	⏚	GND

Note! *If the customer expansion of the use of dual power supply, power input specifications refer to Table2.10.*

Appendix B

Watchdog Timer Programming

B.1 Watchdog Timer Programming

```
------------------------------------------------------------
Enter the extended function mode, interruptible double-write
------------------------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
------------------------------------------------------------
Configured logical device 8, configuration register CRF6
------------------------------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
IN AL,DX
AND AL.OEFH;Setbit 4=0 Pin 89=WDTO
OUT DX,AL
MOV DX,2EH
MOV AL,07H; point to Logical Device Number Reg.
OUT DX,AL
MOV DX,2FH
MOV AL,08H; select logical device 8
OUT DX,AL;
MOV DX,2EH
MOV AL,30H;Set watch dog activate or inactivate
OUT DX,AL
MOV DX,2FH
MOV AL,01H; 01:activate 00:inactivate
OUT DX,AL;
MOV DX,2EH
MOV AL,F5H; Setting counter unit is second
OUT DX,AL
MOV DX,2FH
MOV AL,00H
OUT DX,AL;
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
MOV AL,05H; Set 5 seconds
OUT DX,AL
;-----------------------------------------
; Exit extended function mode
;-----------------------------------------
```

```
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

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